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SURGERY OF THE KNEE JOINT

A REVIEW OF 55 OPERATIONS

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THE knee joint is the largest synovial cavity and likewise the most complex joint in the body. It is not surprising that it is more subject to the vicissitudes of injury and disease than any other joint.

A living pathology of the knee joint is being established pari passu with the use of adequate exploratory incisions.

I described[1] such an incision in 1925, calling it the "general utility" incision. Similar incisions had been described by Payr[2], Petit[3] and Fisher.[4] The incision is begun four inches above the patella in the mid-line; it is carried down to near the upper pole of the patella and curved inward around the patella, then carried toward the mid-line along side the patella tendon to the tibial tubercle. The joint capsule is opened beside the patella, and the incision is extended in the line of the skin incision upward to the top of the quadriceps pouch and downward to the tibial tubercle. The patella is then displaced over the outer condyle and the joint is flexed to a right angle, exposing its interior. This incision was used in substantially all the cases in my series. Uncomplicated semilunar cartilage injuries are not included; the usual small incision was used for these.

The bugaboo of historical operations on the knee joint has been infection with subsequent "stiffness," or even graver consequences to life and limb. This bugaboo has been dissipated by a wider experience with extensive operations on this joint. Such experience has demonstrated that this cavity is at least as resistant to the accidents of operative surgery as is the abdominal cavity. In my series of 55 operations, there were no operative infections, with the exception of a remarkable case of bilateral extensive proliferative arthritis in which suppuration occurred five weeks after primary union. This case will be detailed below.

The operation is done under Esmarch tourniquet. At the termination of operation, a thick compression dressing including most of the thigh and leg is applied. Where ankylosis is sought, a plaster of Paris spica is applied. Otherwise the limb is suspended in a Thomas knee splint with a Pearson knee attachment, and movement, under the patient's control, is begun about the fifth day. Ambulation is permitted when a suitable range of motion has been attained, usually during the third week.

The designation "satisfactory" is applied to cases in which a strong, painless, freely movable joint resulted, or in which ankylosis was achieved as a designed result of a primary operation; "unsatisfactory" indicates those in which such a result was

TABLE OF CASES AND RESULTS

	Operations	No. of joints	Satisfactory	Unsatisfactory
Osteochondral fracture (osteochondritis dissecans) (joint calculus)	7	7	7	0
Chronic synovial hypertrophy of traumatic origin	6	6	6	0
Ruptured crucial ligaments	7	7	5	2
Chronic hypertrophic synovial disease	3	3	3	0
Osteoarthritis	5	5	5	0
Proliferative arthritis	2	2	0	2
Late results of sepsis	9	6	2	4
Active suppurative arthritis	5	4	3	1
Tuberculosis	7	7	7	0
Hemanigoma	1	1	0	1
Fibroma	1	1	1	0
Contracted quadriceps	2	2	2	0
	55	51	41	10

(Hospital for Ruptured and Crippled, 24 operations; U. S. Marine Hospitals, 27; others, 4.)

not obtained. In the latter group are included two cases in which a satisfactory secondary arthrodesis followed a primary unsatisfactory arthroplasty, and two cases in which ankylosis occurred in proliferative arthritis which was destined, in the nature of things, to result in spontaneous ankylosis.

CLINICAL TYPES

Osteochondral Fracture. A moderately severe direct traumatism to the knee joint, such as a blow with a hammer, may result in the complete or incomplete ablation of a fragment from one of the condyles or from the patella. Such fragments tend to become completely covered with cartilage and to be extruded into the general joint cavity, thus forming a free osteocartilaginous body, the familiar "joint mouse." In 1924 I reported[5] three cases demonstrating the condition in its phases of development, and called it osteochondral fracture. Since then I have operated upon four further cases, all due to a definite, moderately severe traumatism and have seen no cases of spontaneous origin, such as is implied in the term osteochondritis dissecans of Koenig. More recently Moorehead has used[6] the term "joint calculus" for the same condition.

The diagnosis in the stage of free osteocartilaginous body is simple, since it is easily demonstrable in the roentgenogram. In the stage in which the fragment is still loosely imbedded in its original situation, the roentgen-ray demonstration is not always easy. Clinically, this stage is manifested by more constant pain and disability than is the later stage.

Ruptured Crucial Ligaments. Severe wrenching traumatisms of the knee joint accompanied by rupture of the crucial ligaments may result in persistent and disabling instability of the joint. That such instability is amenable to control by reconstructing the torn ligaments was first shown by Hey Groves.[7,8] In 1926 I reported[9] three cases in which I had used the "general utility" incision instead of the J-shaped transverse incision of Hey Groves. The present series includes seven cases, in five of which a satisfactory result was obtained.

Chronic Synovial Hypertrophy of Traumatic Origin. Infiltration and engorgement of the synovial folds known as the ligamenta alaria and of the synovia covering the deep surface of the fat pad are very common incidents in all traumatisms of the knee joint. In the engorgement of these tissues is seen the main reason why an injured knee is commonly held slightly bent. In this position pressure on these structures is minimized.

The capacity for subsequent shrinkage and organization in these tissues is very great, since the vast majority of knee-joint injuries get well with or without formal treatment. Occasionally, instead of resolving, the infiltration persists and a fibro-fatty permanent enlargement of these structures results. The infiltrated mass produces persistent discomfort, the joint feels weak and insecure and swells after use or minor trauma. A knee joint presenting such a condition, fully developed, is not amenable to restitution of function except by surgical operation. The operation consists in the removal of the hypertrophied tissues. In my experience, it is

accompanied by uniformly satisfactory results.

Chronic Hypertrophic Synovial Disease. Chronic synovial disease of non-traumatic origin, while it entails the kind of disability outlined in the preceding paragraph, must be considered as a more potential cause of ultimate joint deterioration. Two cases will be reported, one bilateral, in which the etiology was quite obscure.

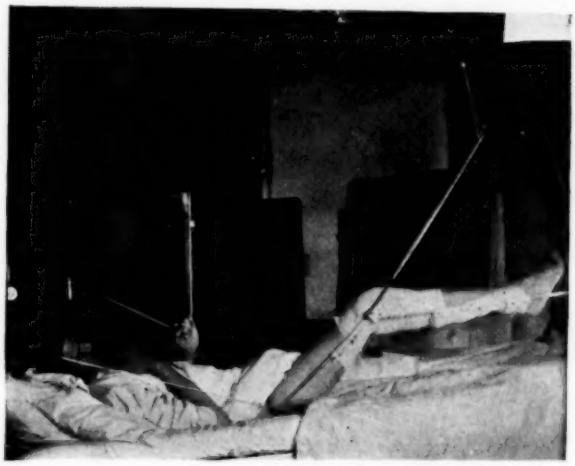

Fig. 1. The institution of movement following operation, under the control of the patient.

Case I. J. G. M. Private file #345. Male, aged thirty-eight. History of two years increasing stiffness on arising, frequent "catches" and insecurity. Two attacks of swelling and disability. Examination: good general condition. Joint a little enlarged, quadriceps pouch outlined, thickened. Atrophy of thigh. Range 170° to 90°. Roentgenogram after oxygen injection shows remarkable obliteration of quadriceps pouch and thickening of fat pad structures.

Operation, January, 1924. Pouch nearly filled with thick, succulent, reddish synovia with considerable fatty degeneration. Similar synovial degeneration in anterior and lateral compartments. Tiny cartilaginous erosion of articular surface of patella. Articular cartilage extremely yellow but smooth and glistening. Operation, complete synovial excision. Result, complete relief, 180° to 110°. Three years later, 180° to 90°; strong stable joint.

Case II. H. S. Private file #1124. Female, aged twenty-five. History of five years duration, progressive. Swelling, pain after use, intervals of increased heat, occasional stiffness. Occasional minor internal derangements. Symptoms much more pronounced in right knee than in left. Has had psoriasis since age of eight. Tonsils removed fifteen years ago. Persistently overweight since adolescence.

Fig. 2. Osteochondral fracture, stage of free osteocartilaginous body. The "joint mouse" lies in the intercondylar space. There is also a club-like enlargement of the anterior end of the semilunar.

Examination: Short, overweight; knock knees fairly marked, flat feet; good general condition. Right knee large and boggy, effusion, thickening. Moderate tenderness inner side. No increased heat. Range 175° to 90°. Roentgenograms negative. Left knee, similar changes, but less marked.

Blood chemistry (Dr. Cyrus W. Field): High figures in blood for sugar and salt with normal renal functions for everything except salt.

Operation, Hospital for Ruptured and Crippled, December 17, 1926. Right knee presented a massive degenerative process involving the whole synovia with great thickening. There were numerous fibrous pads and projections, a few of which had become entirely detached. The fat pad was succulent and purple. The articular cartilage presents a minimal marginal involvement. The diseased tissue was excised en masse; the amount of material removed may be seen in Figure 5.

Four months later similar conditions of lesser extent were found at operation on left knee.

Result: It is obvious in view of the pathology found at operation that both joints

would have proceeded to ultimate gross deterioration. The range of motion attained within the time of observation is slightly less than a right angle, but the joints are painless and increasing in range and usefulness. The result is listed as satisfactory.

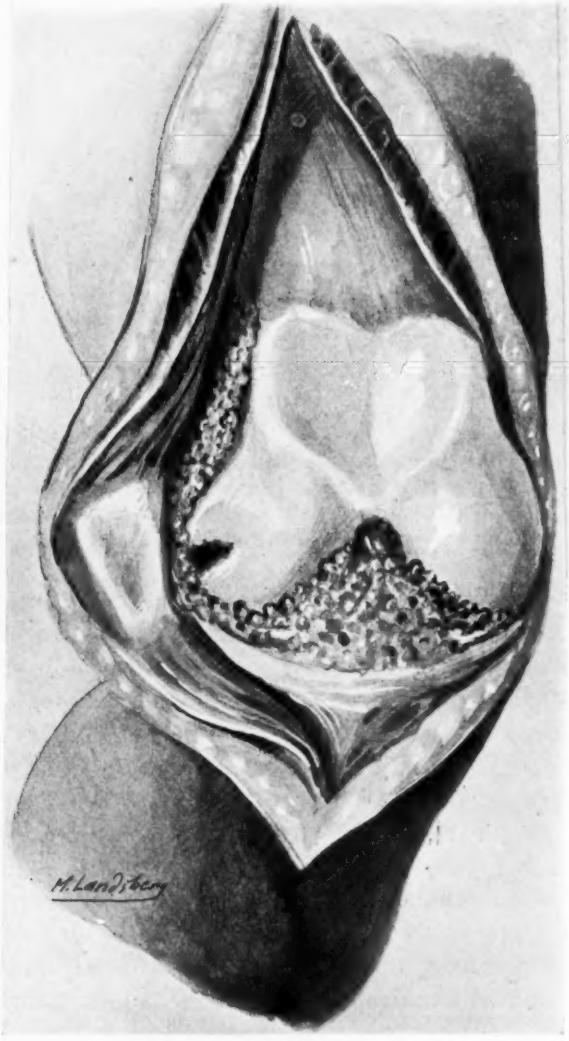

FIG. 3. Chronic synovial hypertrophy of traumatic origin. The fat pad and its prolongations are thick and fibrosed; similar hypertrophy and fibrosis of the synovia of the lateral compartment adjacent to the defect in the condyle, the result of old injury. Five years disability; complete recovery following operation.

Osteoarthritis. The type of disease here indicated is variously designated as arthritis deformans, osteoarthritis, degenerative or hypertrophic arthritis. It is to be sharply differentiated from the type of disease implied in the terms rheumatoid, atrophic, or proliferative arthritis.

The medical practitioner seeks for ultimate causes of this disease and his investigations are carried into the domains of bacteriology, focal infection and disturbances in metabolism. It is an extremely ancient disease, as shown by the findings

FIG. 4. Chronic hypertrophic synovial disease. Roentgenogram of knee with oxygen injection. CASE I.

in early Egyptian mummies. Very often little is found to substantiate the influence of a causative agent on a chemical or a bacteriological basis. It is likely that such joints are biologically weak structures, and that chemical or bacteriological influences combined with the trauma of habitual overstrain are all concerned in the production of the disease.

The disease varies greatly in its manifestations and in the sequence in which the various joint structures are involved. The cases in which osseous changes predominate are not considered as favorable for operative treatment having as its object the preservation of motion. The cases in which synovial changes predominate, on the other hand, respond favorably to excision of hypertrophied and degenerated synovia. Such joints may be restored to complete usefulness, as is illustrated by the following case:

Case III. L. L. Private file #517. Female, aged fifty. Increasing pain and disability in right knee during last six years. For some time disabled after walking 2 or 3 blocks.

Examination: Knee enlarged, fullness in pouch and in tissues both sides of patellar ligament. Slight tenderness about fat pad. Range 180° to 80°. Roentgenograms negative for bony changes.

Fig. 5. Photograph of enormously thickened synovia removed at operation. Case II.

Operation, Hospital for Ruptured and Crippled, October 17, 1924. Fibro-fatty reduplications in synovia of pouch and of fat pad and ligamenta alaria. Superficial fibrillary degeneration of articular cartilage of patella and corresponding portion of condylar face. Excision of fat pad, ligamenta alaria and about one-third of synovia of pouch.

Early recovery of painless motion. Examination three years after operation shows a functionally substantially perfect joint.

Proliferative Arthritis. This is a rather rapidly progressive and extremely disabling type of disease which ends in ankylosis. The only case which I have encountered in this series is a bilateral case in which the outcome was unsatisfactory. It is likewise the only case in which operation precipated suppuration, and that five weeks after healing by primary union.

Case IV. C. H., Male, aged forty-one, U. S. Marine Hospital #21, #13737.

Fig. 6. Case IV. Section made through the exceedingly dense thick synovia, showing areas of round cell infiltration imbedded in thick fibrous tissue.

Three injuries to right knee joint during fourteen years, each followed by aspiration and a long period of disability. The last was some months ago with complete disability since. Left knee and left elbow also disabled for several months.

Examination: Poor condition, bed-ridden, both knees propped up by pillows and extremely painful to slightest movement. Elbow similarly involved. Slight persistent sepsis.

At first both knees were immobilized in plaster and a search for foci of infection was instituted which was unsuccessful within the limits of observation. Condition grew progressively worse. Excision of diseased tissues in right knee advised, on the assumption that this might be itself acting as a focus of infection.

First operation, June 3, 1925. Synovia enormously thickened, velvety, purplish-blue, exceedingly dense and resistant. Scattered erosions of articular cartilage lined with granulation tissue. Fibrillary degeneration of semilunar cartilages. Synovia and semilunar cartilages excised en masse.

Pathological report: Fibro-lipoma arborescens.

Healing per primam. Pain much relieved. Decision to operate on left knee for similar reason.

Second operation, June 24, 1925. Similar findings as in right knee. Suppuration in right knee five weeks after operation, followed in a day or two by suppuration in the left. Both laid open. Gradual healing by granulation.

Result: Ankylosis on both joints. The result is classed as unsatisfactory since it should have been obtained as a designed result of primary operation.

Late Results of Sepsis.

1. Three arthroplasties, two of which were followed by arthrodesis. All three classed unsatisfactory.

2. Case v. R. M., male, aged twenty-four, U. S. Marine Hospital #21, #13902. Duration, eleven months; injury to knee followed by persistent inflammatory symptoms with increased local heat. Eight days after injury removal blood-stained fluid by aspiration. Two months, arthrotomy (elsewhere). Examination: Atrophy, increased local heat, infiltration, painful limited movement. No improvement following fixation in plaster.

Operation. Fibrosis in quadriceps pouch and lateral compartments, partially obliterating those cavities. Remains of fat pad indurated, tough, and generally adherent to the semilunar cartilages and capsule. Excision of diseased tissues; joint could then be flexed 110°.

Result: Unsatisfactory; painful, restricted movement. Persistent inflammatory symptoms.

3. Arthrodesis for postpneumonic sepsis; satisfactory.

4. Excision of densely adherent nature post-inflammatory masses, two and one-half years after severe gonorrheal arthritis. Satisfactory.

Active Suppurative Arthritis. This is a grave affection of the knee joint. In its severer phases, particularly if the infection has been introduced from without, it is of grave consequence to life and limb. Infection from internal sources is of exceedingly variable pathogenecity. Mild infection may subside even in the presence of seropurulent or frankly purulent exudate as determined by aspiration, with ultimate restitution of comparative integrity of the joint. More severe or more protracted infections threaten the function of the joint or may ultimately demand ablation of the limb in order to preserve life.

After a rather long period devoted to observation of the behavior of infected knee joints, I have operated upon four such joints in a stage in which a restitution of joint function might be hoped for. In three of four cases of the type outlined, such a result has been attained. It is of particular interest to note here that in the successful cases excision of the infected synovia en masse was done before the termination of the third week, and that in the fourth case such excision was necessarily delayed until the sixth week. The latter case is still under observation but will probably progress to ultimate ankylosis.

In seven cases of *tuberculosis* of the knee joint in which arthrodesis was indicated, ankylosis followed the designed operation.

Hemangioma. The condition being a rarity, it will be reported in detail at another time. Excision of an extensive growth resulted in recurrence, which necessitated amputation one year after operation, for the latter eight months of which period the man had returned to his occupation as a laborer. Result classed as unsatisfactory.

Contracted Quadriceps. Function may be restored in residual stiffness of the knee joint in the attitude of extension, the result of inflammatory adhesion of the periarticular structures and the extensor muscle by a plastic operation on the extensor mechanism after the method of Bennett. The results of such operation are satisfactory if the integrity of the articulating surfaces has been preserved. The convalescence is somewhat protracted and a complete result is usually not obtained in less than six months. Two personal cases have been entirely satisfactory.

SUMMARY

From my experience in this series of operations I conclude:

1. That in many chronic disabled knee joints, the causes of the persistence of symptoms are contained within the joint itself.

2. That the end products of gross traumatism or of infection in the types of cases above detailed are little, if at all, influenced by extrinsic measures, such as removal of foci of infection.

3. That the retention of such end products within the joint, by precipitating a vicious cycle of traumatism and joint irritation, leads to gradual deterioration of the joint.

4. That the removal of hypertrophic and obstructing tissue at a stage before joint deterioration is too advanced checks this process and results in the restitution of joint function.

5. That in suppurative arthritis operated upon at a favorable time, ankylosis may be avoided by complete excision of the infected synovia.

6. That joint function cannot be preserved in the presence of gross deterioration of articulating surfaces or gross invasion by granulation tissue. Such joints are fit only for arthrodesis.

7. That such operations cannot be satisfactorily conducted through small incisions, and that adequate exploratory incisions are not accompanied by any additional hazard.

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CHOLECYSTECTOMY

WITHOUT DRAINAGE*

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THIS paper is limited to a discussion of cholecystectomy without drainage and its effects. Gall-bladder disease and its surgery is so diversified that one is easily led into other of its ramifications than the one immediately under consideration and thus the issue is clouded.

For many years cholecystectomy without drainage has been a subject of controversy. Quite a few surgeons, the writer included, were rather adverse to following the procedure.

The writer's reason at that time for being opposed to the omission of drainage was that he had noted in cholecystectomy cases that were drained a slight discharge of bile upon the dressings as well as in some instances a considerable amount of serum, the amount of bile varying in different cases. It was noted in some cases that whereas the drain for the first twenty-four or forty-eight hours was fairly dry or at most moistened with a little serum, there was later a discharge of bile daily, varying in amount which continued for varying lengths of time.

However, the subject was fascinating as it held out the possibility of not only securing better wound healing if drainage were omitted but, more important, the probability of fewer adhesions in the upper right quadrant, these adhesions being, as we all know, disabling in a few instances.

In the line of reasoning which led the writer to omit drainage in selected cases, reference is made to a study of perforation of the gall bladder in 1903 which formed part of a paper[1] published in the *Brooklyn Medical Journal*, December, 1905. In this article the statement appears that rupture of the gall bladder occurring as a result of injury to a gall bladder not the seat of disease is not as fatal as rupture occurring as a result of injury in a diseased gall bladder.

This view is supported by the case of a child aged six years (Methodist Episcopal Hospital, No. 1406, service of Dr. Lewis S. Pilcher), who, four weeks before admission, was run over by a light wagon, the wheels passing diagonally over the body across the right hypochondriac and left inguinal regions. This was followed by an acute peritonitis, more marked in the right hypochondrium.

After ten days the peritonitis began to subside and coincidentally there appeared a tumor in the right hypochondrium. Fever was absent, loss of appetite continued, the stools were very light in color, there was considerable distention with gas and continued and rapid loss of flesh and strength. On admission to the hospital the abdomen was greatly distended, there was tenderness over the right hypochondrium and a distinct tumor could be felt there. Aspirations of this tumor resulted in the withdrawal of 71 ounces of bile. Urinary examination showed the presence of bile. Nine days later the abdomen was as large as before and 50 ounces of bile were withdrawn by aspiration. Fel. bovis gr. v, t. i. d., was given. There was some gain in flesh and strength but the abdomen again became distended. The stools were somewhat darker in color. The appetite became excessive. A third aspiration was done and 90 ounces of pure bile were withdrawn. After this there was a rapid reaccumulation of bile in the sac and it was thought that the filled sac occluded the common bile duct by pressure when a certain tension had been reached.

Therefore an incision was made at the site of the previous aspirations. Following this there was a constant discharge of large quantities of bile. The stools remained light colored. The child's temperament changed from peev-

[1] Perforation of the gall bladder. *Brooklyn M. J.*, 19: 450, 1905.

* Read before the Brooklyn Surgical Society, December 6, 1924.

ishness to good nature. About three weeks following the incision the stools became darker in color and the discharge of bile through the fistula lessened. Two weeks later the fistula had closed, the stools were normal in color and the patient had gained greatly in weight.

This case proves that the peritoneum will tolerate the presence of a large amount of pure bile, i.e., bile not contaminated with bacteria; that the peritoneum will absorb a certain amount of bile as shown by its presence in the urine; that even a larger amount of bile thrown into the peritoneal cavity while free at first will in time become encysted.

There occurred a few years ago in the writer's service at the Wyckoff Heights Hospital a fatal case in which a cholecystectomy had been done for acute cholecystitis. This case had been drained and discharged a very unusual amount of bile, so much so that it was thought there might have been some leakage from the common duct. The autopsy disclosed an absolutely perfect common duct and healed cystic duct, but showed that the gall bladder bed had not healed. It had not been sutured on account of the friability of the inflamed liver. The liver surface was raw and from this the bile had escaped.

This case in its turn called to mind a case of echinococcus cyst of the liver which the writer had operated at the Brooklyn Hospital many years before in which resection of the liver was done with removal of the cyst. The raw liver surface in this case was sutured and drainage was instituted. For many weeks thereafter there was a considerable escape of bile from the wound which, however, finally healed.

This brought to mind still another observation that in wounds of the liver, resection or injury, and also in those of cholecystectomy in which there was a considerable escape of bile after the operation, healing of the wound was interfered with by the escape of bile and wound healing occurred more slowly. Also that in wounds in which primary healing had occurred except for the point of emergence of the drain, where there was more escape of bile, there was a breaking down of parts of the wounds and slow healing.

For several months this subject was considered in its various aspects and finally the conclusion was reached that an important step in all liver surgery should be the covering over of raw liver surface to minimize as much as possible the escape of bile. Previously this had been done for the purpose of minimizing adhesions. The cystic duct has never been, in the writer's experience, responsible for the leakage. The conclusion was reached that the indications for drainage were really those of other operations, namely, to provide for the secretions of localized necrosis or of infected fluid. There are a number of cases of gall-bladder disease in which an operation can be done as technically perfect as in appendicitis or resection of the intestine or a gastroenterostomy, and in which the infected focus is entirely removed.

At first drainage was omitted in cases of cholecystectomy for chronic cholecystitis without active infection in the gall bladder or in its neighborhood. These cases did very well.

Next, drainage was omitted in cases in which there was but slight evidence of acute inflammation and in which a technically perfect operation was possible. These cases also did very well.

It is unfortunate in this series to have had to include two deaths, neither of which are due to the omission of drainage; one, a case in which the patient, a very obese woman, had a most stormy course with final wound rupture. On resuturing the wound no peritontitis, or escape of bile, or lesion other than that caused by the wound rupture was discoverable. The writer thought there was an obscure lesion of the pancreas present, perhaps a beginning carcinoma, but with this the consultant, entirely familiar with all the facts, could not agree. The case finally suc-

cumbed from pneumonia twenty-two days postoperative. The other fatality, dying five days postoperative, was examined through the wound and proved to have no evidence of bile leakage or peritonitis but did have an enterospasm with intestinal paresis. Both cases had the benefit of prolonged study by medical attendings before being subjected to operation.

HISTORY OF THE PROCEDURE

In 1904 Mayo Robson remarked that drainage might perhaps be thought unnecessary in the absence of oozing or infection by pus or gall-bladder secretions.

In 1905 Moynihan stated if inflammatory changes are limited to the gall bladder, drainage need not be provided, the whole abdominal wall being snugly closed. His routine practice as stated in his later works, however, was to drain although he kept to the same opinion concerning it.

In 1905 Witzel reported a series of 500 cases in which cholecystectomy was done and no drainage used. There was one death which was not analyzed.

In 1912 Goldman, basing his paper on the work in Rotter's Clinic, advocated closure in simple cases and denounced in general the indiscriminate use of peritoneal drainage. He reported 95 cholecystectomies without peritoneal drainage with one death caused by wound erysipelas, the autopsy eliminating the possibility of abdominal accident. His series included acute cases.

There was quite a controversy about the procedure in 1912, Rotter defending his position against the adverse criticism of Kehr, and quoting the experiences of Riedel, Witzel and Hoffmeister.

In 1917 Willis reported 38 cholecystectomies without drainage.

In 1919 Richter drew special attention to the harm done by unnecessary drainage of the peritoneum, particularly in duodenal ulcer and following cholecystectomy.

In 1920 Bottomley discussed the question, calling attention to the desirability of dispensing with drainage and also the desirability of shortening the time of drainage when it was used.

In 1921 C. H. Mayo stated that more and more he was closing the abdomen without drainage and in only a few instances satisfying his old inclination to drain by leaving a double strand of catgut attached to the liver where the fundus was separated from it and continuing with the suture down to the cystic duct. This catgut is brought out of the abdomen but the abdominal wall is closed tightly around it.

In 1921 Buchbinder discussed in a most excellent paper his experience with cholecystectomy without drainage dating back to the clinic of Richter in 1916.

A search of the literature shows many articles upon the subject, some for and some against the procedure. A few unfortunate cases have been reported. Some of the discussions are quite diverting as, for instance, the discussion of Stewart McGuire in which he says, "I drain all my cases because if the drain does no good it does no harm and I believe it is safer for the patient; it certainly saves me from anxiety and makes me sleep better," to which Dr. A. Murat Willis of Virginia replied, "Dr. McGuire sleeps better when he employs drainage. He will find his patients sleep better if he omits it in suitable cases."

The writer's opinion is that drainage is certainly safer for the patient when one considers the calamities which follow its non-use in some cases.

PATHOLOGY

Statistics of 81 cases; male, 17; female, 64.

All cases showed evidence of chronic inflammation. They have been classified, however, according to the most prominent aspect of the inflammation present, as follows:

Cholecystitis catarrhalis acuta	14 cases
Cholecystitis catarrhalis chronica	6 cases
Cholecystitis chronica	61 cases

Of the latter, five showed in addition to the chronic inflammation, acute chole-

cystitis; one, a subacute pancreatitis; one, a curious lesion of the pancreas, whether of a malignant nature or a chronic inflammation I am unable to say.

Adhesions were present in all cases, varying from slight adhesions of the ampulla to the duodenum to extensive adhesions involving the fundus as well. Enlargement of the gland at the upper portion of the cystic duct was present in all cases. Microscopic section was made in each case.

Stones were present in about one-half of the cases. Whether gallstones are present or not is immaterial, for they are but one of the ways in which an already existent inflammation expresses itself. Personally, the writer does not believe there is any such thing as innocent gallstones but that they are the product of inflammation; that a gall bladder once infected is always infected, and such a gall bladder may become at any time a source of real danger to the patient through either acute exacerbation of the inflammation or through change to carcinoma during middle or later life.

Some surgeons write as though there were two forms of gall-bladder disease, one with stones and one without. Such is not the writer's opinion. The stone is the product of the inflammation and the formation of stones does not constitute a distinct variety of cholecystitis. Given an inflamed bladder, a stone may or may not be formed. Gallstones are not the cause of the disease but the result.

There were three cases of special interest, a curious lesion of the pancreas just referred to, one of cystic disease of the liver (this was a case in which the liver presented the appearance of being filled with shot, there being numerous small black shot-shape and shot-feeling areas which on incision yielded clear serum) and a case of sclerosis of the pancreatic artery without general arteriosclerosis. One case was operated upon early in pregnancy. This subject would make an interesting one for future discussion.

In several cases associated operations were done for the following lesions: nephroptosis, 2; relaxed perineum, 2; cirrhosis of the liver, 1; duodenal ulcer, 2; umbilical hernia, 1; hemorrhoids, 1; cystocele, 1; prolapsus uteri, 1; diastasis of recti muscles, 1; adhesions (other than gall-bladder disease adhesions) resulting from previous operation, omental, 9; intestinal, 1; old peritonitis, 2.

In 16 cases the appendix had been removed at a previous operation. In 64 cases of the series the appendix was removed at the operation for gall-bladder disease. In one case no attempt was made to remove the appendix (a very bad case complicated by myocarditis and operated under local anesthesia).

Another interesting observation is the final results in the cases complicated by myocarditis. The heart condition was invariably much benefited. This observation may well be discussed at length at some future time. The length of rest in bed postoperatively was made longer by the caution used in getting the cardiac patients up and about.

HOSPITALIZATION

It is my practice to keep patients in the hospital until they are strong enough to care for themselves. Occasionally a patient will insist on going home as soon as he or she can walk about. More rarely some will wish to overstay their time. The longest stay in the hospital was twenty-nine days (Case No. 64), a case of advanced myocarditis. The shortest stay was thirteen days. The average stay for 80 patients was eighteen days.

WOUND HEALING

Eighty cases are considered, one case (No. 14) being omitted as death occurred five days postoperative. In no case was there any escape of bile through the wound nor any bile discernible in the wound during any of the wound complications.

Primary union, 71 cases. Wound com-

plications, 9 cases classified as follows: serum, trifling in amount, 1 case; serum and later pus, 2 cases (very slight infection); infection, upper angle, 1 case; infection, lower angle, 1 case; hematoma, superficial, 1 case; hematoma, deep, 1 case; wound rupture, 2 cases.

Temperature range after operation (81 cases considered). The average lowest and highest temperature for each of the first three days postoperative was first day, lowest temperature 99.2; highest 100.4; second day, lowest temperature 99; highest 99.8; third day lowest temperature 99; highest 99.6°F.

The average of fifty temperatures of cholecystectomy with drainage was 99°F. for fourteen days postoperative. This temperature study was made in connection with the use of the Fowler position after operations upon the upper abdomen. It was found that the temperature average was lower in cases in which the Fowler position was used. This point was utilized in a paper read before the International Congress in London in 1914, the study showing that infections through the lymphatics are less prone to occur after operations upon the upper abdomen if the patients are placed in the Fowler position.

The temperature range does not seem to be influenced to any great extent by the omission of drainage. As a matter of fact the temperature after cholecystectomy depends upon two factors, the character and amount of infection present, and the delicacy with which the operation is performed.

RESULTS

Postoperative Complications (cases considered, 81). Uncomplicated course, 66 cases. In 15 cases there were noted the following complications: slight cough, 2 cases; severe cough, 3 cases; pleurisy, 1 case; pneumonia, 2 cases (in one the pneumonia occurred three days after the patient left the hospital and required his return to the hospital); intestinal paresis, 1 case; chill following catheterization seven days postoperative, 1 case; prolonged and severe shock, 1 case; protracted vomiting, 1 case; protracted vomiting, severe cough, mental disturbance, 1 case; excessive vomiting, wound rupture (terminal pneumonia), 1 case; vomiting of blood, 1 case (a gastroenterostomy had been done for associated duodenal ulcer and blood was noted in the vomitus once).

Final Results. Hard and fast conclusions should not be drawn without due consideration of the relation between the pathology present and the final result. The final result is dependent on the pathology present and the extent to which the technique by which that pathology has been removed or relieved by operation.

It should be remembered that once the disease has passed beyond the gall bladder itself the chances for a complete cure are materially diminished and in the advanced stages of the disease cure is at times impossible though considerable amelioration of symptoms is obtainable.

Two cases died, one five days and one twenty-two days postoperative.

There are 22 cases on whom no report has been received since they were discharged from the hospital.

In 26 cases reports are on file giving the condition two to six months postoperative. Of these, 23 reported entirely well, one unrelieved and two reported slight occasional indigestion.

In the period from six to twelve months we have 15 reporting, 11 as completely free from symptoms and three as having occasional slight digestive disturbances and one as having occasional moderately severe pain.

In the period from twelve to eighteen months there are 8 reporting, 7 entirely relieved, one unrelieved.

In the period from eighteen to twenty-four months six cases reported, two entirely relieved, three with occasional slight digestive disturbances, and one relieved of his gall bladder symptoms but who has developed duodenal ulcer.

In the period from twenty-four to thirty months there are two cases, both entirely relieved.

Considering the 16 cases in which reports are available after periods ranging from twelve months to thirty months postoperative, 11 reported entirely free from symptoms, one unrelieved,three slight occasional indigestion and one has developed duodenal ulcer symptoms but is free from gall bladder pain.

Two cases have developed incisional hernia, one (No. 24) due to a severe cough which is still present, the other (No. 46) due to protracted vomiting and cough. This latter case has since had the hernia repaired.

The only cases which are of use for comparison as to final result are those reporting after one year, 16 in number. The percentage of cures in these cases is 70; the fair result percentage is 19; and the no relief percentage 11. These percentages are approximate.

The Relation of the Pathology to the Final Result. Nine cases showing slight digestive disturbances. Case No. 1, cholecystitis catarrhalis acuta. Appendicitis chronic. Case No. 3, cholecystitis chronica. Arteriosclerosis of pancreatic artery. Gastrocoloptosis. Case No. 4, cholecystitis chronica (strawberry). Appendicitis chronic. Case No. 11, cholecystitis catarrhalis acuta. Adhesions, colon, omentum and stomach. Appendicitis chronic. Kidney adherent to duodenum. Case No. 17, cholecystitis chronica. Appendicitis chronic. Case No. 29, cholecystitis chronica. Intestinal adhesions to old appendix scar. Case No. 31, cholecystitis catarrhalis chronica. Adhesions, gall bladder, duodenum and liver. Case No. 56, cholecystitis chronica. Cirrhosis of the liver. Inflammation of the omentum which was enormously thickened. Appendicitis chronic. Case No. 59, cholecystitis chronica. Appendicitis chronic.

Two cases show no real improvement. Case No. 34, cholecystitis chronica. Adhesions to stomach, omentum and duodenum. Extensive omental adhesions to anterior abdominal wall opposite and below the umbilicus. Case No. 79, cholecystitis catarrhalis acuta. Omental adhesions to old scar.

Comparison of Ectomy with and without Drainage. Wound infection seems to be at least as common with drainage as without. The same may be said of hematoma. The writer's impression is there is a slight difference in comfort in favor of those cases which are not drained. Comfort following operation bears a distinct relation to the skill used in operating and in caring for the wound afterwards.

The real value of comparison is in the final result. For this purpose we have 81 cases without drainage, a number entirely too small to be of great value. Of these (16 cases) which were under observation long enough (one to two and one-half years) to allow a fair estimate, 70 per cent were cured; 19 per cent showed mild symptoms; 11 per cent showed severe symptoms.

For comparison we have 406 cases of cholecystectomy with drainage (reports available one year or more postoperative). Of these 365 cases or 94.8 per cent reported themselves as being well; 10 cases or 2.46 per cent reported themselves as having mild symptoms; 11 cases or 2.7 per cent reported themselves as having severe symptoms. These figures show an overwhelming superiority percentage in favor of cholecystectomy with drainage.

This is shown even more forcibly when we compare the cases of cholecystectomy with drainage which show symptoms of some kind. The total number of such cases was 21 or 5.2 per cent while the total number of cases of cholecystectomy without drainage showing symptoms of some kind at periods varying from one year or two years and a half was five cases, or approximately 30 per cent of the cases (16 in all) which come within the time limit specified.

Of course these latter figures are too small in number to be of real value but at least they are suggestive.

CONCLUSIONS

Drainage should be used in cases in which there is any outlying infection, cases in which the gall bladder is acutely inflamed, in cases in which the common bile duct is drained, in cases complicated with pancreatitis subacute or acute, and in cases in which hemostasis is not perfect; in other words in all cases in which a technically perfect operation cannot be performed. Before closing the abdomen without drainage in cholecystectomy, a light fluffy sponge moist with saline should be placed along the sutured gall-bladder bed in the liver and lightly packed down into the foramen of Winslow. This gauze should come in contact with every bit of the operated area so as to make a print of any oozing areas. After a few seconds it is removed and it is noted whether or not there is any blood or bile stain upon it. If such stain is found a fresh sponge is fluffed out, the source of the stain is ascertained and if it cannot be remedied drainage should be used. The writer has in mind a case recently in which a technically perfect operation was apparently performed and in which had the precaution above outlined not been used the abdomen would have been closed with possible subsequent calamity. The sponge, however, showed that there was considerable leakage of bile from the liver surface itself. This leak could not be stopped by further suturing and drainage was employed. For many days after the operation the wound drained bile, the patient finally making a good recovery. Here we had probably to do with injury to an anomalous dilated biliary radicle.

Drainage may be omitted if the cystic duct has been properly crushed and ligated and peritonealized, if the raw surface of the liver has been properly sutured to prevent the escape of bile, if hemostasis has been accurate and if there was not found at the operation any outlying infection in the way of fresh adhesions, and if the gall bladder itself is not acutely inflamed. In other words, a technically perfect operation in the absence of infection does not require drainage. On the contrary, to drain such cases is to invite adhesions which may later cause disabling symptoms. It is of small value to have operated upon a case with digestive symptoms at an early stage of gall-bladder disease where few adhesions are present, and to have introduced a foreign body which will produce those very adhesions which we have operated early to avoid.

The writer wishes to state that he does not advocate the universal omission of drainage in cholecystectomy, for he is not convinced that it is an entirely safe procedure and he is very certain that it is not a safe procedure to be used by the many who are operating on an occasional gall-bladder case.

It requires very sound judgment to know when drainage may be dispensed with, and the writer has not yet proved to his satisfaction that the possible risk of its omission is compensated for by the final result.

TRAUMATISMS AND INFECTIONS*

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LOS ANGELES

IN considering the various surgical handicaps due to delay, one cannot escape the conclusion that many trivial infections are converted by neglect and maltreatment into conditions sufficiently formidable to deserve serious surgical consideration and having potentialities from the standpoint of morbidity, mortality, industrial time loss and permanent disability ratings to warrant consideration.

Infections about the finger ends are entitled to first consideration on the basis of their great frequency of occurrence. In this group may be included eponychia, paronychia, subungual abscess and abscess of the distal anterior closed space.

Delay in recognizing and treating appropriately a simple eponychia permits this exceedingly common lesion to be complicated by a subungual abscess, the result of an extension of the infection through the delicate proximal end of the nail, around its proximal end or laterally, effecting in any instance a separation of the nail from its matrix.

Failure to recognize the existence of a subungual abscess and to remove such part of the nail as the infection has separated from its matrix or bed permits the separated nail to act as a foreign body and is responsible for the long duration of many of these cases and the fungating granulations which spring up and interfere with drainage.

The existence of an accompanying subungual abscess should be suspected in cases giving a history of a discharge which has persisted for forty-eight hours, and where examination shows a change in the opacity of the lunula or any irregularity in its outline.

Infection of the paronychium may be primary or may result as a direct extension from the eponychium with which it is directly continuous. Here again delay in treatment commonly results in a subungual abscess which usually forms between the nail and its bed distal to the lunula along the margin of the nail and frequently extending proximally between the nail and its matrix.

In an abscess of the distal anterior closed space, the following facts must constantly be kept in mind:

1. The epithelium of the anterior aspect of the finger beyond the distal flexion crease in very thick.

2. The subcutaneous tissue is divided into numerous compartments by vertical strands of dense connective tissue.

3. The distal phalanx receives a dual blood supply. One set of vessels supplies the epiphysis and a second set the diaphysis. The vessels which supply the epiphysis are branches from the digital vessels given off before the main vessels enter the distal anterior closed space and are separated from this space by the flexor tendon, entering the epiphysis just distal to the attachments of the capsule. The diaphysis receives its supply from branches of the digital vessels which unite to form a network just proximal to the bulbus tip of the phalanx and enter the cancellous tissue of the bone, largely on its under surface. This arrangement of the diaphyseal vessels is such as to subject them to pressure from the accumulated products of infection. In the anterior closed space firm connective tissue traveculae and dense overlying skin permit only limited expansion, and pressure from edema or pus increases rapidly. Furthermore the entrance of numerous vessels into the under surface of the bone facilitates the extension of infectious material into the bone.

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4. In childhood bony union between the epiphysis and diaphysis has not taken place and separation between these two parts is frequent in neglected cases. The time element is of the utmost importance to individuals employed in those branches of skilled labor or in the arts or professions where the integrity of the tactile sense and the normal contour of the finger tip is essential to the proper performance of their various tasks. The importance of early recognition and the institution of treatment aimed to restore complete function with a minimum tissue loss cannot be overemphasized.

Scarcely anywhere in the realm of surgery is delay most costly than in failure to diagnose and institute adequate treatment in the case of infections of the tendon sheaths of the hand and the various related spaces. In fulminating cases virulent infections of the flexor tendon sheath of the thumb or little finger may extend to their mutual involvement via intermediary bursa and related spaces both in the hand and above the wrist.

Most carbuncles come to surgery with a history of procrastination and of futile and dangerous attempts on the part of the patient to abort them. Squeezing and peroxide are the arch offenders. Few even in the profession realize the gravity of carbuncles in certain locations, notably upon the upper lip. In a recently observed series comprising 15 of these lesions, in but one was the importance of the infection recognized by either patient or physician and in all but one case highly improper and dangerous treatment had been instituted.

In the diabetic patient the incidence of infection depresses the pancreatic function of insulin production, blood sugar rises and ketosis follows. If the absorption from the infection is sufficient to cause a general systemic reaction with elevation of temperature, there is an increase of body metabolism with an associated increase of catabolism of the body's fats and proteids, a frequent loss of appetite with nausea and vomiting which further interferes with nutrition and results in dehydration; tolerance for carbohydrates falls, ketosis increases and coma approaches. Many cases showing no glycosuria but with a high blood sugar make but slight reparative progress in the face of infection until this condition is recognized and controlled.

Four years ago the annual surgical report of the Los Angeles Metabolic Clinic revealed 130 different surgical lesions, ranging from finger infections to carbuncles and mid-thigh amputations. It was significant that most of these cases illustrated the pathology of delayed surgery. This fact was recognized and in following years each group of cases that passed through the routine instruction of the clinic was instructed in prophylaxis of minor surgical conditions and the importance of early advice and competent management of any infection. The results of this effort have been striking. At the end of the first year of instruction, though a larger group had passed through the Clinic than in previous years, the incidence of surgical condition was lessened by 50 per cent. Each succeeding year has shown substantial reductions until a neglected infection is now almost unheard of in that particular group of patients.

What has been done in this clinic can and should be done in other controlled clinic groups and in private practice.

It is certain that a more widespread knowledge of the importance of adequate treatment for the minor infections would in the aggregate save a tremendous amount of human suffering, expense and unnecessary permanent disability.

MALIGNANCIES*

CHARLES STEPHEN JAMES, M.D., F.A.C.S.

LOS ANGELES

THERE is an increasing interest in the cancer problem, evidenced by the number of organizations referable to malignancies for the education of the public. The American Society for the Control of Cancer is the outstanding organization and should receive the wholehearted cooperation and support of the medical profession. We hear much of the education of the public but experience teaches us that it is, in a measure, an almost hopeless task to attempt to teach the laymen to watch for the insidious early signs of this serious malady.

It is possible, however, to educate ourselves. Let us do it! Let us "pluck the beam from our own eye" rather than expend all our efforts on the mote in the other fellow's eye.

A grave responsibility rests upon the "man on the firing line," the general practitioner. It is he who first sees the cancer patient and upon his recognition of potential malignancy present in the frequently small inoffensive lesion or symptom brought to his attention by the patient largely rests the ultimate success or failure of the treatment.

If more medical men would "think cancer" there would be earlier diagnoses and therefore more successes with surgery. Do not wait for loss of weight, cachexia, palpable masses in the belly and remote glandular masses to diagnose carcinoma or wait for a pathological fracture to denote sarcoma.

"Think cancer" until you can definitely prove it otherwise when you are consulted for tumors, swellings or "lumps" (superficial or deep), cracks, fissures, tears and ulcerations of the nipples, vagina, rectum, or gastrointestinal tract (lips to anus), nipple retraction, bleeding from lung, stomach, gut, bladder or uterus, and also for inflammatory areas of chronic character.

It must be recognized, however, that not all medical men have the same confidence in the treatment of cancer by operation and point to their long list of unfortunate experiences with cancer treated by surgery. Pertinent to this, I relate a personal incident. One morning, in an adjacent town, when I was operating upon a patient for ruptured gangrenous appendix necessitating the placing of numerous drains, the attending physician asked with an illy concealed note of resentment in his voice, "Doctor, why is it that you have drained nearly all of the cases of appendicitis you have operated upon for me, thus increasing their discomfort and stay in the hospital? You drain so few that you operate upon for my competitor, Doctor X. This, I think, affects unfavorably my reputation in the community."

What was the answer? It is confessed that none was made. What would you answer him? The deduction is obvious in both instances.

If more medical men would take into consideration the danger of delay and the ofttimes nearly hopeless state of the cancer patient before operation is attempted, and would inform themselves of the comparatively slight risk of operation in the early, localized, non-metastasized lesion, more physicians would "think cancer" when confronted by some of the early or presumptive signs of malignancy.

When the clinician has listened wisely to the history, examined the patient minutely and deduced logically, he will either be practically sure he is dealing with malignancy or he may be almost convinced that the condition is non-malignant. In

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many cases a surgical procedure will be required without delay—either diagnostic, radical, or both (biopsy when indicated) in arriving at a definite determination. Too often the patient receives the careless assurance that "it is just a minor affair," "it does not amount to anything," or, "we will examine it again some time later if it increases in size or severity."

Surgeons have properly stressed greatly the time factor in the treatment of malignancy. The degree of malignancy should also be considered. This necessitates operation being performed in a standard institution where the cooperation of a trained surgical pathologist is available and where, within three to five minutes, information can be obtained not only as to the existence or non-existence of malignancy but also as to the degree of malignancy (whether of grade one, two, three, or four). This information may be invaluable in determining the technique, extent and character of the operation.

A preoperative opinion, confirmed by the pathologist, as to the grade of malignancy may be of aid in determining whether operative treatment should be by excision, cautery, surgical diathermy, roentgen ray, radium or by any combination of two or more of these surgical measures.

We must not lose sight of the fact that other equally difficult problems have been solved by long continued, undaunted effort. A little fact here, a little progress there, until eventually the entire fabric of a new fact is woven. For instance, much less than fifty years ago the cause and prevention of sepsis was as obscure as that of cancer today. And who could visualize in that day the far reaching results of the solution of the sepsis problem?

Optimism in our manner and thought referable to this problem should prevail as we note the increasing number of cures following a well-planned and executed method of treatment and observe the many more patients whose sufferings have been alleviated and postoperative remission established with marked improvement, productivity and definite value to family and community.

Is it not worth while, when operation reveals an inoperable intra-abdominal carcinoma, to do one of the several short circuiting operations that have proven of so much value, e.g., gastroenterostomy, enteroenterostomy, enterocolostomy or colostomy? These afford increase or resumption of function with attendant benefit to the patient as well as afford the opportunity in many patients for prolonged arrest of malignant activity by means of effective radiation.

Should not these facts and the many benefits from timely interference excite a spirit of optimism?

It is not the purpose of this paper to present to you any new facts, but it is an effort to set for a time the traffic signal against carelessness and thoughtlessness in omitting to use, in our contact with the public, the assets with which we are already familiar and have available.

That master teacher, Sir William Osler, once said, "If you wish to put over a fact or principle you must recognize the value of reiteration, reiteration, reiteration, without irritation." Hence this effort, a "reiteration," hoping to replace a part of the pessimism now prevalent with a spirit of optimism so necessary to the public, physician and patient, if our combined efforts are to be fruitful in the solution of the cancer problem.

MANAGEMENT OF CASES WITH PRESENT OR POTENTIAL UROLOGICAL PROBLEMS*

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LOS ANGELES

THE day is passing when the surgeon is merely a technician. Technical skill should be complemented by that knowledge of the history and progress of disease which leads to a well-balanced clinical acumen and judgment. With the great increase in the knowledge of pathological physiology and the interrelationship of the various diseases, a more active cooperation between the internist and surgeon is imperative. The low surgical mortality of today stands as a monument to such cooperation and is directly due to its application to the preoperative preparation of the handicapped surgical patient. Among these handicaps may be mentioned complicating cardiac, renal and metabolic diseases. Emphasis must be laid on the fact that it is often necessary to go even further than diagnosis of these handicapping conditions when quite evidently they are present. One must ferret out potential conditions which may possibly come forth as complications at the time of surgical treatment. Today the field of urology stands as a well-defined example where the surgeon must be amply equipped to diagnose disease and prepare patients for surgical treatment, as well as be a skillful technician.

To the urologist often falls the lot to deter the surgeon from too hurried surgical treatment. Differential diagnosis, especially of diseases in the right side of the abdominal cavity, often shows urologic diseases mistaken for other surgical conditions. Some well-known examples are appendectomies and cholecystectomies in cases where there may be a ureteral calculus or some form of kidney disease, the removal of female pelvic organs for an ureteral kink, stricture or nephroptosis, and the occasional exploratory laparotomy for an intestinal obstruction when an acute pyelonephritis may be causing tympany, constipation and vomiting. The gathering of presumptive evidence by performing a careful urinalysis, by roentgen-ray examination of the urinary tract and by renal function tests may help to forestall such errors. We should even investigate further in cases showing pressure signs, such as those with hernias and hemorrhoids. Careful examination of the lower urinary tract for obstruction should always be instituted. Search for latent prostatism in male patients over fifty years of age should be a part of the routine measures in preparing all such cases for surgery. The simple passing of a urethral catheter for a residual may give valuable information and help to avert later embarrassments. If there is a residual, renal functional tests and preliminary drainage by an indwelling catheter for the same length of time necessary to prepare a prostatectomy patient should precede any elective operation.

In urology surgical risks may be considered as both operative and clinical. Contributing important operative circumstances influencing the recovery of such a patient are the surgical sense and technique of the operator, the character and extent of the operation, the operative complications, the choice and nature of the anesthetic and the resultant degree of operative shock. The prognosis is determined by such clinical conditions as the mental and physical state of the patient, his bodily resistance and power of reaction to operative and postoperative complications. In most operations the first group is the most important. Nevertheless, as already

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stated, it is incumbent upon the surgeon to give proper consideration to preparatory treatment and selection of a favorable time for operating to reduce the mortality to a minimum. In urological surgery the clinical and preparatory measures attain equal importance with the surgical. This is because most urological cases have some organic urinary type of involvement with a resultant danger to or loss of renal and cardiac function. Furthermore the frequent presence of these urological conditions in elderly men with further renal and cardiac burdens increases the danger all the more. These clinical risks do not as a rule occur singly but are more often associated with each other in varying degrees of importance, being secondary to the primary clinical disturbance. In their correct estimation a familiarity with many clinical and laboratory methods of examination is demanded. Should the case not be a satisfactory risk, the question arises as to which special line of preparation is necessary to make it so.

Urological operative risks may be clinically grouped as (1) renal, (2) cardiac, (3) cardiorenal, (4) hypertensive and (5) infectious. We have no time to go into detail here other than to state that a careful history and physical examination are paramount. Progress of the preparatory treatment is carefully controlled by such laboratory measures as the phenolsulphonphthalein test and the blood nitrogen estimations. Even these are of limited value, but when they are properly performed and correctly interpreted by the experienced surgeon they serve as a great help.

In conclusion let me again state that the best preparation of the handicapped surgical patient demands the concerted action of all branches of medicine—the internist, surgeon and laboratory man; that the surgical patient should have the most careful examination, especially where unusual conditions may be observed, and that elderly surgical patients be examined for any latent handicaps which may further complicate the patient's recovery in a crisis.

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SURGERY FROM THE INTERNIST'S VIEWPOINT*

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LOS ANGELES

SINCE patients circulate from doctor to doctor about as freely as a dollar bill does in the business world, it affords the subsequent physician a splendid opportunity to judge the value of previously made diagnoses, and this much more accurately and under more favorable conditions, since all of us have the opportunity of profiting by others' mistakes. So there is in my discussion no intention to criticize harshly the errors made in ill-advised surgical diagnosis. It seems obvious, however, that surgical diagnosis has not kept pace with surgical technique.

My argument in this discussion is that mistakes in hasty, premature diagnoses often result in operations for the wrong condition, with the consequent suspicion and loss of confidence on the part of the public directed toward surgical procedure and the medical profession generally. To illustrate I shall cite a few cases that come to my mind.

Recently an appendectomy was done because of sudden pain in the right lower quadrant, accompanied by rigidity and nausea. The patient had no fever, the leucocyte count was undetermined, and as far as I could ascertain, there was no justification for the precipitous surgical treatment. Two weeks later there was a recurrence of the same symptoms. The urine and roentgen-ray study revealed the presence of a calculus in the right ureter at the level of the umbilicus, the removal of which resulted in cure.

A young married man who for nine months had been treated by one osteopath and four members of the regular profession for pain in the back, received a diagnosis of arthritis. His tonsils were removed by one and most of his teeth by another. On suspicion a Wassermann test was made by the third and, although the reaction was negative, six or eight injections of neosalvarsan were administered on general principles. Finally, some twenty injections of iron and arsenic were given by the fourth. The history of onset of the acute pain while loading lumber suggested, of course, an injury to the back. A roentgen-ray examination revealed a fracture of one of the transverse processes. The diagnosis would have been made at once had adequate study and proper deliberation been given the case.

I know of two or three patients a year with gastric crises operated for various supposed abdominal lesions. I recall a patient treated by radium over a period of six months for carcinoma of the tongue without benefit. A routine Wassermann gave a 4 plus reaction, and the patient responded promptly to treatment. About fifteen years ago, in a presidential address before the Los Angeles County Medical Association, I thought that the report of 170 cases of chronic appendicitis that had been operated without benefit to the patient might be instructive. Since then several other papers with the same purport have appeared. Our present knowledge and experience should forbid the removal of a so-called chronic appendix without very careful and discriminating study. In a large majority of these cases we are dealing with cecal or ascending colon stasis. Unless the function of the cecum and right colon are at the same time restored to the normal by the operative procedure, the removal of the appendix is worse than useless and a discredit to surgery. Equiva-

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lent remarks might be made concerning chronic gall bladder. In a large majority of these cases the diagnosis is wrong and the patients are not benefitted by the surgery done.

In the past year and a half I have studied 18 to 20 cases of genitourinary lesions ultimately restored to health on proper diagnosis and surgical treatment which had been operated from one to four times for various abdominal lesions—chronic gall-bladder disease, chronic appendicitis, duodenal ulcer, various pelvic operations, etc. Incidentally, our present point of view is that in the study of chronic dyspepsia and abdominal ailments it is as necessary to eliminate genitourinary lesion as thoroughly and routinely as duodenal ulcer, gall-bladder disease, or appendicitis.

What are the consequences of such errors? They have had the tendency to elevate the chiropractor, the osteopath and the members of the other cults engaged in the treatment of the sick to our own level in the estimation of a very large percentage of our legitimate clients. All of us must have been impressed by the large number of patients consulting us who have recited how they had gone first to the osteopath or to the chiropractor because of the fear that if they consulted a regular physician he would have advised some surgical operation which they feared would be of no benefit.

There is a very wide difference in the results obtained in operations of necessity as compared to the operations of choice. Nothing is more brilliant in results than such operations of necessity as those for acute gall bladder, acute appendices, ruptures of the viscera, etc. The results are appreciated by the public and confidence restored in the minds of the public. But in the operations of choice such as those for chronic appendicitis, pelvic conditions and gall-bladder disease, we do not have and do not merit the same confidence.

What recommendations can be offered to correct this surgical handicap? These mistakes can be corrected only by better medical education, more deliberate and exhaustive study and more accurate diagnoses. It would seem there is not sufficient cooperation between the internist and the surgeon. Might it not be well to have, particularly in operations of choice, some plan similar to that required in all standardized hospitals before operations for abortions are approved. The recent legal measure sponsored by Governor Smith and adopted by the Legislature of the State of New York whereby a judge who condemns a criminal cannot convict him is interesting and suggestive. In any event whatever curbs to hasty, surgical operations that might be evolved would remove one of the greatest surgical handicaps.

DISCUSSION OF PAPERS BY DRS. BURNAP, JAMES, KUTZMANN AND FULTON

Dr. Breslin. It is very clearly shown that the surgeon who works alone without the cooperation of the internist, the laboratory man and the surgical pathologist, must do an injustice to his patient. How many times have we seen a coronary thrombosis with pain in the abdomen which a keen internist would have diagnosed and later have proved in an electrocardiographic tracing? How many times have we seen an internist diagnose a central pneumonia? To my mind a first class operating team consists of the operator and assistant operator, working intelligently with the internist, trained laboratory man and surgical pathologist.

Dr. Wessels. When an internist is called in by a surgeon, there must be something wrong. It is usually the general practitioner who calls in the surgeon; it is seldom the other way round. I am sure that when the patient goes to a surgeon first, there isn't much danger of delay.

More than once we have had patients come into the office and say, "I went to see Dr. So and So. He felt my abdomen and insisted that I go to the hospital at once for an operation." Often after a careful study of the condition, we find there is no surgical indication whatever. Such experiences cause one to wonder whether "delay" is more serious than "rush."

Traumatisms and infections are handled more and more by the industrial surgeon, less and less by the general practitioner and not at all by the internist. I am sure that the industrial surgeon is developing judgment concerning surgical indications so that there is decreasing danger of delay in that field.

In malignancy, of course, delay is dangerous. I do not believe, however, that there is ever a case of malignancy that would be harmed by the delay of three or four days incidental to a careful analysis. I have seen cases of lumps in the breast that have never become carcinomatous and there was no suspicion at all that they might become carcinoma. These should not be subjected to surgery.

However, I have very little patience with the surgeon who will operate an inoperable carcinoma thinking that death is preferable to suffering. I think such a procedure is against medical teachings. Nevertheless, I agree that many of these cases of carcinoma of the pylorus with complete obstruction obtain relief from pain and have a prolongation of life by a gastroenterostomy. My impressions about urological conditions is that the internist, because he is likely to make more complete analysis, makes fewer errors than the surgeon.

The problem, after all, resolves itself into the question of team work. I am sure that the internist, when he is convinced that he has a surgical condition, does not hesitate to refer it to a surgeon. I do not believe that practice in the other direction is so common.

Dr. Scholl. There have been two interesting reports on calculi that have a bearing on the subject. In a series of over 1,400 cases of renal stone, 50 per cent had at least one operation and 20 per cent two or more for the relief of their symptoms before the operation for renal stone was performed. In a second series of 400 cases of ureteral calculi, 23 per cent had either their gall bladder or their appendix removed. At least one half of these cases had stones in the left ureter. Not infrequently the patient comes in the office and says that his appendix or gall bladder has been taken out. He arrives at the office with the roentgenogram under his arm and says, "Doctor, I know that you will be easy with me; I am not very well. I am not over the other operation yet."

I feel that all cases of tumor of the abdomen that are not definitely localized to the gastrointestinal tract or to pelvic organs should have a complete cystoscopic examination, including pylography, to rule out involvement of the genitourinary tract. I recently had a case that had definite symptoms of, and was diagnosed as, gallstones. The patient had an attack of jaundice together with pain in the upper right quadrant of about two weeks' duration. There were practically no signs of urologic disease except a few pus cells in the urine. He was a man aged about fifty-four and all signs pointed to gall-bladder disease. In spite of the paucity of urologic symptoms cystoscopy was done. An almost completely occluded, right-sided pyonephrosis, containing 150 c.c. of highly infected urine, was found. Complete relief of all symptoms was obtained from permanent ureteral drainage. The catheter was then deliberately removed to see if this would cause a return of symptoms; the prompt return of pain and jaundice suggested a close causal relationship. A second ureteral catheterization again gave him relief and was continued until the time of his operation. He had no return of symptoms following a removal of his infected kidney. At the present time, eighteen months later, he is perfectly well. Apparently in this case the heavy ptotic kidney dragged on the bile ducts causing a kinking and obstruction. This together with a marked perinephritis caused his gall-bladder symptoms.

Dr. Toland. Probably the one answer to the bad effects caused by delay is one of medical education. Many of our best men believe that medical students in this country spend too much time in educational preparation, but I am thoroughly convinced that such is not the case. We need: (1) full university courses laid out for medicine, (2) the regular medical course, (3) an internship of not less than eighteen months, (4) fellowship of three years in a recognized clinical institution, followed by (5) not less than five years of general practice, followed by specialization if desired.

THE ACUTE SURGICAL ABDOMEN*

JOHN F. CONNORS, M.D.

NEW YORK

ACUTE conditions of the abdomen present what I consider the most interesting, fascinating and still the most perplexing problems with which we are confronted in our daily medical life. This is true for the following reasons:

1. In most instances the patient is seen at home and we are forced to depend upon the senses which God gave us. I know of no other field in medicine where the proper application of these senses require such deliberate action. Our diagnosis must be made without the aid of any one, without the exact laboratory findings and all the other highly developed mechanical adjuncts of the present day. We have only our powers of observation and our clinical experience by which we may be able to interpret correctly our observations and to devise our method of attack. We are reminded of the days sometimes called the "good old days" when we were not so well fortified with the mechanical aids in diagnosis available today. In many instances we were just as well off. Go back to the days when there was no roentgen ray to help us in our treatment of fractures. Our results were not so much worse than they are today, due, I believe to the fact that we were unable to see whether or not we had good anatomical position and looked only for function.

2. Time is a very important factor in these cases. One must bear in mind that a diagnosis must be made and the treatment instituted if our end results are to be good. When we drive our cars to a railroad crossing we are impressed by the sign which reads, "Stop, Look and Listen." We all appreciate that we are on dangerous ground. Bear in mind these three words when you are called to see an acute abdomen. Use two of them, "look and listen" and instead of "stop" use "palpate," for when you use these three senses well you are in a position to be able better to cope with the situation at hand.

"*Look.*" In my days as an intern we had a visting physician, Dr. William Hanna Thompson, who to the greatest degree had cultivated the art of making diagnoses by observing the patient while the history was being read to him. It was very amazing to me and it taught me a lesson from which I have received many benefits. I have tried for the past thirty years to apply this same process insofar as I could in my own work and I can assure you it has helped me in a great many instances.

When we are called to see a case of this class the first thing we should do is to observe carefully the facial expression of the patient, for there is that indescribable "something" about it which is very difficult to convey. One should be able to tell whether or not the patient is suffering severely from pain. He should see the flushed face of a pneumonia case and of others that might be mentioned. There is no doubting the expression presented in cases of peritonitis, that drawn expression of suffering which once seen will not be soon forgotten. If this great "something" could be accurately described and conveyed to the younger men of the profession, what a great service would have been rendered. Let me take this opportunity of asking you all to remember the expression on the patients you are called to see and try to compare it with other cases which you have seen at some time or other. I realize that it takes years of application to attain this power of observation but once attained it will add to your qualifications one of the greatest assets I

* Read before North Harlem Medical Society, January 20, 1928.

know. One will be well repaid if in his inspection he will observe the respiratory excursions of the chest and abdomen, for in the cases of abdominal inflammation you will find the patient making every effort to move the muscles of the abdomen as little as possible—so called nature splinting—nowhere so well pronounced as in cases of perforation of the stomach or duodenum.

"*Listen.*" Listen to the patient's history carefully, correlate the symptoms described by him and make your deduction. In many cases where one has already formed a diagnosis he will lead the patient to recite the history as he wishes it to be told and which will very often lead to a wrong diagnosis. Guard carefully against any such methods of history taking.

"*Palpate.*" A volume could be written on this one point and I am sure too much time or stress cannot be put upon it. I first learned what properly interpreted palpation meant while attending the clinics of the late John B. Murphy of Chicago. The profession at large owes to this great man an everlasting debt of gratitude for teaching us how to use this as a help in our diagnosis in acute abdominal conditions. I can rightfully say that palpation is a fine art and one which can be cultivated by constant practice. Palpation must not be confined to inflammatory conditions alone; palpate the normal abdomen as well. When palpation is properly applied we are reminded of the finished pianist. Palpation should be made with the open hand, entirely relaxed and fingers extended. If rigidity is suspected on the right side, it is always advisable to make our first touch on the opposite side, gradually working our way to the suspected point. If our palpation is made on the affected side and the patient is hurt his confidence in us is lost and further efforts to obtain any results from palpation will be unproductive. It is never necessary to make deep palpation in acute abdominal disorders; consequently the gentler our pressure, the better will be our results. While you are palpating the abdomen, watch the expression of the patient carefully and you will be rewarded by locating the exact point of pain. An effort must be made to distract the patient's attention after the discovery of the sensitive area; during this period of distraction return to the point of greatest pain and note the reaction. Often rigidity of the abdomen will be missed entirely by palpation wrongfully applied. Let me make this appeal to you all: Cultivate to the highest degree the art of palpation, for in observing the expression of the patient you will have added greatly to your ability to correctly diagnose acute abdominal conditions.

Much has been written concerning the acute surgical abdomen. One of the best articles I have read recently was written by Dr. J. M. Birnie.[1] At a meeting of the Surgical Section of the Massachusetts Medical Association held in Boston in June of last year and at which I was present, this condition was about as carefully discussed as I have ever heard it. It was covered from every angle, the papers and discussions thereof were most illuminating and I believe we would be well repaid if we were to read them.

SYMPTOMATOLOGY

Pain. We shall not attempt to consider categorically the differential diagnosis in cases of acute abdomen, for I fear that if we start we shall go too far afield and nothing will be gained. We might better consider the symptom common in all these conditions, pain, which is present in all acute abdominal conditions. Its greatest importance is its location, its origin and the position in which the patient can place himself to alleviate it. In cases of appendicitis the patient will be more comfortable with the right leg drawn up; the pain will increase when the leg is extended. In perforated gastric or duodenal ulcer the patient will invariably be found with both legs drawn up to prevent tension on

[1] Birnie, J. M. Diagnosis of abdominal emergencies. *Boston M. & S. J.*, 194: 635, 1927.

the abdominal muscles. There should be a distinction between pain and tenderness, as in cases of pain over McBurney's point or such that when pressure is made the patient will complain that it hurts. This might be the point of greatest tenderness rather than pain. Description of pain as lancinating, boring, etc. is unnecessary, because the qualifying adjectives are of little value.

It must be remembered that pain depends a great deal upon the individual. Many patients bear a great amount of pain without complaining, while other patients complain most vehemently about the slightest pain. In these latter cases the personal equation must be used as a guide in determining the amount of actual pain.

Vomiting. Vomiting is another symptom common to these cases but it cannot be considered as of great importance in aiding diagnosis for it may be present or it may be absent in any of these cases. Also let it be mentioned that there are patients who have a tendency to vomit.

Temperature. A rise of temperature is expected in all cases of an inflammatory nature. While inflammation may be present, there will be no appreciable rise in temperature until there is absorption of the toxic products of the inflammation. This is seen very well in cases of perforated gastric ulcer. There is no early temperature. If the case is not operated upon before the beginning of peritonitis, the temperature will rise. We believe that the presence or absence of temperature is of little or no value in diagnosis.

Blood Counts. The leucocyte count is particularly spoken of as an aid in differential diagnosis but I am not yet convinced of its efficacy. I am sure many of you have seen cases of well advanced appendicitis in which the leucocyte count was normal or nearly so. For years we have heard that it is a reliable indication of the resistance of the patient, but when an operation is decided upon, whether the patient's resistance is good or not, we are compelled to take the risk and trust that he will be able to withstand the shock. This whole situation was summed up by the late Albert Ochsner who said that we always have a leucocyte count made but it is never considered when we think there should be an operation. In other words a leucocyte count should never take the place of clinical experience.

Age. Not long ago we were taught that certain acute abdominal conditions were found only at different ages, but I believe this theory is no longer reliable. We considered appendicitis a disease of young or early adult life but we now know that it may exist at any age, for we have all seen cases in the late sixties and early seventies. Gall-bladder disease was likewise considered as belonging to middle or later life, but it is not unusual to find it in the young. Not so long ago we had a case of gangrenous gall-bladder in a girl fifteen years of age upon whom a diagnosis of appendicitis was made.

Let it not be understood from the foregoing that I suggest immediate operation in these cases. On the contrary, no operation should be performed until you have brought into play every known method at your disposal. At the Boston meeting previously mentioned, Dr. John H. Gibbon said that an intuitive diagnosis is a rapid method of reaching a wrong conclusion. He compared the rushing of the patient to the operating room to the unreasonable rush of the hospital ambulances through the streets, an unnecessary menace to the patient in one case and to the patient and pedestrian in the other. One great cause of hurry in some cases is the thought that if I do not do this right away, some one else will. Our object is and has been for many years a better understanding and cooperation between the medical man and the surgeon, for you all know that the greatest responsibility rests upon the general practitioner who is called upon to make the diagnosis and call for the aid of a consultant. Another reason why these emergencies need a great deal

of thought and serious consideration is because this work frequently has to be done by the inexperienced operator; yet in no field, probably, do experience and judgment count for so much as in acute lesions of the abdomen. It may take a young man who has had anatomical training before taking up surgery but a short time to make himself an adept operator, but after all the knowledge of anatomy and the surgical dexterity which one may acquire will never make him anything more than a mechanic. It takes years of experience and hard work to gain that surgical judgment which is the greatest gift that a surgeon may possess. When all is said and done, this is what makes the great surgeon.

There is not time for us to attempt to consider the differential diagnosis in these cases of acute surgical abdomen but let me urge you always to make the simple diagnosis.

ACUTE CONDITIONS

Appendicitis. This is by far the most common cause of the acute surgical abdomen. Some have placed the occurrence as high as 70 per cent. There is neither time nor need to consider the signs and symptoms of this disease for they are well known to you all. In spite of our advancement in surgical knowledge and skill, the mortality from this very common condition is on the increase. Some years ago Dr. Charles Mayo said it was increasing because it was not talked about enough. He said that in the days when it was discussed at every meeting of the American Medical Association by Murphy, Deaver, Bevan, Ochsner and others, the results were better. It is obvious that we are at fault somewhere. Perhaps it will be necessary to start an educational campaign such as we have been carrying on on cancer.

We should educate the public to refrain from the administration of cathartics in the presence of abdominal pain. This I think would be a great step forward. Have the patient seen by a doctor as soon as possible after the onset of pain, which is the sign usually presented first. Once the patient is seen by a doctor, there will be little chance of escape, for in this day of rapid scientific advancement he will be operated upon by a surgeon or so-called surgeon who has not truly given enough time or study to the case. In some instances these cases are not operative and should be left alone. I wonder if we ever stop to consider that to some extent our mortality increase can be rightfully attributed to the character of the surgery performed.

A word might be said in reference to the operation for appendicitis. I believe that when the abdomen is opened sometimes too much time is spent in searching for the offending organ, particularly in the presence of pus. I think that many chances of recovery are jeopardized by prolonged operation, combined with the trauma thereby inflicted. There are many cases in which if a drain were inserted and the patient returned to bed he would have recovered even though he might be compelled to undergo a secondary operation.

Acute Salpingitis. In these cases pain and tenderness occur in the lower part of the abdomen, with rigidity the same on both sides because as a rule the disease is bilateral. The temperature is higher, the abdominal rigidity more diffuse and the patient more acutely ill than in cases of appendicitis. Bimanual examination should help us in the diagnosis. If one is unfortunate enough to operate upon a case of this character by mistake, it would seem wiser to close the abdomen without attempting to remove the inflamed tubes, since the mortality in these cases at this time is high and operation may be deferred until a time when the outcome will be more successful.

Pneumonia in Children. Pneumonia in children is often mistaken for appendicitis of an acute nature. While tenderness, pain in the epigastrium and some rigidity will be present, the temperature will be found to be higher and the pulse more

rapid. While there might be rigidity, no sensitive spot will be discovered by careful palpation. This was brought home to me some years ago in a case which I had diagnosed as appendicitis in a child eight years of age who had pain, vomiting, and rigidity with no history of any error in diet. Dr. Joseph Winters saw the case and corrected the diagnosis. It was the first time that I knew that signs of appendicitis could be found in cases of pneumonia.

Stone in the kidney and pyelitis are sometimes mistaken for appendicitis. Repeated careful examinations of the urine will establish the diagnosis. In stone in the kidney the pain experienced is most severe and in many instances requires a great deal of morphine to allay it. It begins in the loin and is transmitted to the thigh. In both the above mentioned conditions the Murphy sign will be present, and while the patients may have a great deal of pain they never appear as acutely ill as with appendicitis. It must not be overlooked that bladder disturbances, painful micturition and in some cases inability to void are present in appendicitis. These conditions arise when the appendix is situated low down in the pelvis.

Twisted ovarian cyst, particularly on the right side, may be mistaken for appendicitis but this will be cleared by bimanual examination.

Ruptured gastric or duodenal ulcer is one of the greatest calamities we find in acute abdominal conditions; at the onset it might be mistaken for appendicitis. I know of no lesion within the abdomen which demands more rapid decision. The rigidity of all the other conditions in the acute abdomen are to be compared with that found in these cases. The board-like rigidity extends all over the abdomen and once felt can never be forgotten. In many instances in large hospitals having an ambulance service, the diagnosis is made by the ambulance surgeon before the case is admitted. We are told that these cases are in shock when first seen but in our experience we have seen perforated gastric ulcers in patients who have been quietly resting in bed and apparently suffered no shock. It is thought that these cases invariably give a history of long standing gastric disturbances but in many of our cases the first sign has been the pain of the perforation.

A patient, a man sixty years old, who never had had any pain or gastric disturbances was admitted to the hospital with the diagnosis of perforated ulcer. When the abdomen was opened a huge ulcer was found on the anterior surface of the stomach. The question of careful speed in these cases is by far the most important factor in this condition. The time between perforation and completion of the operation plays a large part in the outcome. For years I have advocated the closing of the perforation by suture, inserting a drain and doing no more. I appreciate what Dr. Deaver and others have said about doing a gastroenterostomy at this time but the results obtained by us warrant us continuing the simpler operation. I have seen some years later three cases on whom I did the closure, one at autopsy which presented no evidence of ulcer, and two which were cases upon whom I had operated subsequently for other conditions without gastric disturbances. One must remember that it is possible to find more than one perforation and that both the duodenum and the stomach should be carefully inspected. I personally have seen one case that had two perforations on the anterior wall of the stomach about an inch apart. It might be thought that in closing the perforation, particularly at the junction of the stomach and the duodenum where almost all the perforations are found, the lumen might be narrowed, making necessary a gastroenterostomy. All of these cases done by us have been roentgenographed before discharge from the hospital and none of them have shown the slightest retention after six hours.

Intestinal Obstruction. Pain is a very important symptom in these cases but I believe the cramp-like character is not the same as we find in appendicitis. In obstruction the pain is intermittent, returning when the peristaltic movement of the bowel attempts to pass the place of the existing obstruction. Vomiting as a symptom is of little value for diagnostic purposes until it becomes fecal and then we are dealing with a much more serious affair than if the diagnosis had been made and operation performed earlier. When we are summoned to a case of this kind let us use our powers of observation. I have seen a case who had vomiting for two days with a strangulated hernia which had not been observed. Scars of previous operations may give a clue that may be of assistance. I know of no condition in surgery of the abdomen which requires greater skill and display of surgical judgment than cases of intestinal obstruction. Once the diagnosis is made immediate operation should be advised. When a case of this kind is operated upon the surgeon may be compelled to do the simplest or the most complex operation. It must be borne in mind that as in other abdominal operations the time spent in operating is an important factor in the outcome. The question of resection is always before us. From our experience these cases do not do well. We think that if gangrenous gut is found it will be far better to place this segment outside the abdominal wall and do a secondary repair. Far too much time is wasted watching to see if a suspicious piece of intestine will regain its normal color. Gangrenous gut has been seen at autopsy in cases in which it was thought that the circulation had returned sufficiently to warrant replacing the segment. It is not so much the intestine itself as the mesentery which should be considered. We have not obtained very satisfactory results from the insertion of drainage tubes for it has been our experience that only a very small area could thus be drained. Of course this does not hold true with obstruction of the large intestine. It is unnecessary here to take up the difference between true intestinal obstruction from extrinsic causes, an obstruction caused from within, impacted feces, or malignancies. The obstruction brought about by extrinsic causes presents a more acutely ill patient than do those of interior origin.

A very important factor in these cases is the postoperative care. Usually they become dehydrated; where there has been considerable vomiting they have lost the salts and the chlorides, and should be treated by the administration of salt solution given under the breasts and by rectum. Let us spend a minute to think of gastric lavage. Not only in this condition but in many other where there is postoperative vomiting, gastric lavage should be employed much more frequently. I believe that Deaver was right when he said the house physician should carry a stethoscope and the house surgeon a stomach tube. The mortality from intestinal obstruction is very high and until we can operate upon these cases much earlier than we do now it will continue to be so. Once the diagnosis is established, be it partial or complete, operation should be immediately performed. A word might here be said as to the prevention of intestinal obstruction. We fully realize that by far the great majority are postoperative. As little trauma as possible should be caused and no raw surfaces should be left for these are all potential causes for intestinal obstruction. It is far better to operate upon a case diagnosed as intestinal obstruction and find no obstruction than to wait for further symptoms. In the former case no harm has been done, while in the latter it invariably is a fatality.

Rupture of the gall bladder is such an uncommon occurrence that we will mention it only as a possibility in an acute abdomen. In my experience of thirty years I have seen but one case. Gangrene of the gall bladder develops so slowly that there should be no hurry about operating. The

mortality from gall-bladder operations is greater than we are led to believe. Some years ago we had a mortality rate of more than 25 per cent at Harlem Hospital. At that time all cases were operated upon as soon as the diagnosis was made, but since we established the waiting method our mortality has markedly decreased. We think that no case of jaundice should be operated upon except under extenuating circumstances. The mortality will be infinitely less if the jaundice is allowed to clear. Jaundice cases are predisposed to hemorrhage. We believe that no gall-bladder case should be operated upon until every known method of providing against fatality should be employed; bleeding time and coagulation time should be determined and calcium chloride administered to provide against hemorrhage. This will all be of value in the outcome. The question of cholecystectomy and cholecystotomy must always be considered. I do not think that cholecystectomy is as simple an operation as we are led to believe, although in almost every instance it is the operation of choice. Notwithstanding this, if a simpler operation were done, we would have more recoveries.

Ruptured Ectopic Pregnancy. If the history is carefully taken and the patient observed closely, the diagnosis should not be difficult. Operation should be advised, for if we are dealing with an appendix or a ruptured ectopic pregnancy, operation is indicated. In this particular group of cases a blood count will be of some advantage.

Traumatic Injuries. Many cases in this class will show abdominal rigidity, although there is no rupture of a solid or hollow viscus. Trauma which produces a hemorrhage in the abdominal wall will cause rigidity such as is found with intra-abdominal lesions but if these cases are carefully observed they will be found to have less pain. The organs of the abdomen are divided into two classes, solid and hollow. Anatomically it would appear that the spleen and liver are well protected but we find at operation that these two organs are most frequently traumatized. In these cases there is little pain, in contradistinction to those in which we have an intestinal rupture. The character of the trauma applied to the abdominal wall in many instances will help in establishing the diagnosis. In the liver and spleen cases, particularly the spleen, we find that trauma has extended over a great area when the patient has been run over by an automobile or wagon. On the other hand, rupture of the hollow viscus occurs when the trauma is applied over a smaller area such as those occasioned by the kick of a horse or by striking against a small blunt instrument such as the handle bar of a motor cycle. The indication for operation in trauma of the spleen or liver where the rupture is a small one is very difficult to define unless there is apparent shock caused by excessive hemorrhage. I think that there are many injuries to the spleen and liver in which the hemorrhage controls itself. In fifty cases of ruptured spleen we could not point to any one symptom which we could call classical. If these cases are operated upon and a ruptured spleen is found, the spleen should be removed although there is no active hemorrhage at the time, for we have no proof that when the blood pressure rises the hemorrhage will not recur. We have seen no ill results in our cases of splenectomy for trauma. In injuries to the liver where mattress sutures cannot be applied, packing should be used, care being taken not to apply it between the raw surfaces. It should be used as described by Dr. John H. Gibbon to bring the raw surfaces into contact, thereby hastening agglutination which will control the hemorrhage. If packing is placed between the raw surfaces, hemorrhage is apt to recur when the packing is removed.

Traumatic rupture of the kidney is diagnosed by pain, swelling and blood in the urine, and is not operative. While the hemorrhage may appear profuse, the kidney is so confined by nature that pressure from the adjacent organs will act

as a control for the hemorrhage. If an operation is done it would necessarily have to be a nephrectomy. This is well exemplified in a case which I did some years ago. The patient was knocked down by a trolley car, a huge swelling appeared in the right loin and pure blood was found in the urine. At operation we found a large white kidney with three tears. The opinion of the assistants was that the kidney should be removed. I thought that the opposite kidney must be of the same variety and so I did not remove it. Instead I used packing and the patient made an uneventful recovery. Subsequently I learned that the patient had been refused life insurance but was accepted some time later.

Mesenteric Thrombosis. Acute Hemorrhagic Pancreatitis. Inflamed Meckel's Diverticulum. These are such uncommon occurrences that no time shall be devoted to them except to warn of their possible occurrence.

SUMMARY

This entire discussion may be summarized as follows:

1. Use your special senses, combining subjective and objective symptoms.
2. Make the simple diagnosis.
3. Use every known aid in diagnoses.
4. Lose no time but do not rush the patient to the operating room.
5. When operation is decided upon, bear in mind the simpler the operation the better the outcome.

I appreciate that we have tried to cover a vast subject in this paper and have only touched on the "high spots," but in the end if I have succeeded in stressing the importance of only one of these "high spots" my efforts will not have been in vain.

A BRIEF CONSIDERATION OF EPITHELIOMA OF PENIS & TERATOID TUMORS OF TESTIS*

ARCHIE L. DEAN, JR., M.D.

NEW YORK

THE purpose of this presentation is to describe briefly two malignant tumors of the external genital organs of the male, namely, epithelioma of the penis, and the teratoid tumors of the testis. The clinical material which forms the basis of this paper consists mainly of those patients examined and treated in the Department of Urology of the Memorial Hospital.

EPITHELIOMA OF THE PENIS

There were 75 cases in this series.

The outstanding factor in the causation of penis cancer is the tight prepuce difficult or impossible to retract. The retained secretions are a well-recognized source of chronic irritation. Hard, inspissated smegma is a potent factor of mechanical irritation, and the presence of fatty acids may furnish irritation of a chemical nature. For this reason the disease is practically never seen among Jews or Mohammedans. We have no record of a case of penis epithelioma developing in a man circumcised as an infant.

Syphilitic ulcers and scars are mentioned frequently as of etiological importance. Leucoplakia is recognized as a precancerous lesion. In addition, papillomata of the penis have been known to undergo malignant degeneration, while accidental trauma of various degrees of violence in certain instances has been described as a contributing cause. In our experience these factors have seemed of but secondary importance when subjected to critical examination. Phimosis alone was found in 74 per cent of our patients. A positive diagnosis of syphilis was made in 20 per cent of the cases but these men all had a certain degree of phimosis as well. In 3 per cent, leucoplakia unquestionably preceded the cancer, but each of these patients had submitted to a circumcision in adult life, probably for sufficient cause.

PATHOLOGY

There are two clinical varieties of epithelioma of the penis, the papillary and the flat. Histologically each lesion is a squamous carcinoma. Each type spreads by progressive involvement of contiguous structures, while at the same time it penetrates more deeply. Metastases occur by embolism. Lymphatic permeation is a later stage in which cancer emboli, caught somewhere in the lymph channel, grow in the directions of lesser resistance.

The superficial areas of the penis are drained by lymphatics which communicate with the nodes in the groins. The deeper tissues are drained by vessels which accompany the dorsal vein of the penis to nodes in the pelvis. On this account, and because penis cancer remains a superficial lesion for some time, it is the inguinal nodes which we examine for earliest metastases.

In general, metastasis occurs rather late in the course of the disease. On the other hand we have evidence suggesting that certain types of treatment, especially those in the nature of incomplete destruction, are conducive to early metastases.

Ulceration of the primary lesion occurs early, and the environment of filth results in secondary infection becoming a prompt and constant superadded factor.

Buck's fascia, owing to its relatively dense consistence, is a natural barrier to the superficial tumor. When this structure has been penetrated and the cavernous tissue has become involved, we promptly make our prognosis more grave and alter our type of treatment.

* Read before the American Urological Association, New York Branch, Nov. 23, 1927.

SYMPTOMS

The first symptom noticed by 73 per cent of the patients was a small sore on the penis. The most common site for the primary lesion to appear was somewhere on the glans. Nine per cent were aware of irritation followed by a small sore, 5 per cent suffered from paraphimosis, circumcision revealing a carcinoma, while 5 per cent first saw warts beneath a tight prepuce. The patients with leucoplakia noticed "scaly skin" which in one case appeared as a "corn."

As the disease progressed the sore gradually increased in size and in a few cases pain developed. In the majority there was discharge of foul, purulent material from beneath an inflamed prepuce.

It is noteworthy that in practically all of the cases, even though phimosis and chronic balanitis had been present for years, a condition appeared, recognized by all, as something decidedly different, even though its nature was not appreciated.

DIAGNOSIS

The diagnosis of epithelioma of the penis should be made histologically. We believe that a biopsy carefully performed with a sharp razor does little if anything toward hastening metastasis. There is no doubt that in most instances a competent physician can make a correct diagnosis clinically, still our records show much valuable time lost under inappropriate therapy before the true nature of the lesion was discovered. Moreover, following Broder's grouping of malignant tumors, scientific treatment is based upon the intimate details of cellular structure and arrangement. This is revealed only by the microscope.

TREATMENT

The prophylactic treatment of epithelioma of the penis consists in the circumcision of all male infants.

The therapy of penis cancer at the Memorial Hospital is dependent upon the size of the primary tumor, how deeply it has penetrated, and upon the presence or absence of metastases. In all cases we attempt to obtain an accurate estimate of the extent of the primary lesion. Occasionally this requires a dorsal slit or lateral incisions. Whatever form of treatment is adopted, a strenuous effort should be made to obtain as clean a field as possible. This diminishes the inflammatory element about the primary tumor, and to a corresponding degree reduces absorption of the products of inflammation by the inguinal nodes. The importance of infection coexisting with metastases in lymph nodes can not be overestimated. Such a condition is not amenable to external irradiation, and when radium emanation tubes are buried in the nodule a discharging sinus often follows. The result is a rapid spread of the disease.

Owing to the fact that the majority of our patients present themselves with regional adenopathy, and because it is difficult to differentiate between inflammatory and cancerous nodes, we treat all groins routinely with high voltage roentgen rays, employing exposures of 320 milliampere minutes with a focal distance of 50 cm., filtration of ½ mm. of copper and 1 mm. of aluminum, and 200 kilovolts.

1. If the primary lesion is 2 cm. or less in diameter, superficial, and no metastases can be detected, we employ irradiation alone. The primary tumor is treated with a plaque,* the dose being 1200 millicurie hours per square cm. at 1 cm. distance filtered through ½ mm. of silver and 1 mm. of brass.

There were 13 patients in this group; 12, or 92 per cent are living without signs of disease. One patient died at another hospital following an operation. These men have lived 1, 6–9 months; 3, 9–12 months; 1, 1–2 years; 2, 2–3 years; 2, 3–4 years; 2, 6–7 years; and one, 8 years and six months respectively after the first irradiation.

Occasionally the carcinoma, though small, has penetrated deeply. In such cases irradiation with the plaque is usually followed by a conservative amputation. There were four patients so treated; 100

* The plaque is a small box which contains radium emanation in silver tubes. The side of the box which overlies the tumor is made of brass, 1 mm. in thickness.

per cent are living and well, 1, 2–3 years; 2, 3–4 years; and 1, 5–6 years respectively after the first irradiation.

2. If the primary tumor is larger than 2 cm. in diameter and no metastases are found, the treatment of choice is usually irradiation followed by a conservative amputation.* In certain cases the radium application alone suffices, while with other patients who present more extensive tumors, a conservative amputation is performed without preoperative irradiation. In this group there were 31 patients. Nineteen or 61 per cent are living and well, 5 or 16 per cent are known to be dead; while 7 or 22 per cent are lost from our records. The living patients have survived 1, 6–9 months; 4, 1–2 years; 2, 2–3 years; 4, 3–4 years; 3, 4–5 years; 4, 6–7 years; 1, 7–8 years respectively after the first irradiation.

3. Those patients who were first seen with both a primary lesion and metastases were 18 in number. Three or 16 per cent are living, two with signs of disease; 15 or 82 per cent are dead.

When there are definite groin metastases the patient receives high voltage roentgen-ray treatment of 320 milliampere minutes at 50 cm. distance filtered through ½ mm. of copper and 1 mm. of aluminum combined with a radium pack exposure of 9000 mc. hours at 6 cm. distance filtered through ½ mm. of silver and 1 mm. of brass. At the end of three to four weeks a block dissection may be performed.

4. Nine patients were referred for postoperative irradiation. Of these two were considered disease free at the time of admission. They are alive and well 5 years and 11 months, and 7 years respectively since the first irradiation. The remaining seven patients were suffering with metastases. However two are still alive and apparently well 2 years and 6 months, and 8 years respectively after the first treatment.

* We believe the conservative type of amputation a distinct advance in operative therapy. Amputation is performed 2 cm. proximal to visible or palpable evidence of disease. The success of the measure depends upon the fact that metastasis is by embolism. It is not at all uncommon to preserve so much of the organ that coitus is accomplished satisfactorily.

COMMENTS UPON THE RESULTS

Surface irradiation alone causes a satisfactory regression in a high percentage of superficial cancers of the penis. With deeper early lesions irradiation followed by a local removal is sufficient.

When a large portion of the penis is involved, even if the tumor is superficial, irradiation is not recommended though probably it could control the disease. A conservative operation is thought preferable:

(1) Because it removes but little more of the organ than has already been destroyed by the disease;

(2) A large irradiated surface is unduly painful;

(3) Even should the remains of the penis be salvaged, the result probably would be a misshapen organ of but slight utility.

The very poor results obtained with the metastasizing tumors illustrate how inadequate our present method of therapy is in combating disseminated squamous carcinoma in the presence of secondary infection. Perhaps more frequent amputations might have rendered the metastases more amenable to a combination of irradiation and radical groin dissection.

Teratoid Tumors of the Testis

There are 124 patients in this series.

ETIOLOGY

Much remains to be learned regarding the factors which predispose to the development of teratoid tumors of the testis. However, it appears significant that the great majority of the patients are in the years of their greatest physical and sexual vigor. The importance of external trauma is difficult to evaluate. Occasionally tumor development so closely follows a definite injury that the association of cause and effect seems obvious. On the other hand after careful questioning 85 per cent of our patients could recall no unusual event preceding the appearance of the tumor. Trauma seemed to be of etiological importance in 11 per cent of the cases.

Howard, examining many thousands of

men in London hospitals, found the incidence of undescended testes to be 0.06 per cent. Assuming this to be a fair average, our records show an incidence of teratoma in undescended testes to be 237 times as great as in normally descended organs. Furthermore, while no figures are available regarding the frequency of intra-abdominal testes in a large number of adults, on the basis of our figures teratomas are found in approximately 220 abdominal testes to one in the normal situation. Therefore, while trauma must be considered an etiological factor of importance, it seems probable that in addition there is a predisposition to tumor development in the undescended testis. These retained testes are usually not fully developed or they undergo fatty degeneration or fibrous hyperplasia. The interstitial cells are often increased and may even form macroscopic nodules. As is well known, the capacity to furnish spermatozoa usually is lost early.

PATHOLOGY

Ewing's original classification of teratomas seems an adequate and simple working basis for the study of these tumors.

It is likely that the disease arises usually from sex cells situated in or near the rete testis, occasionally from those in the tunica. The important characteristic of these cells is that they are totipotent, and for this reason may develop tissues representing any of the three germinal layers, ectoderm, mesoderm, or endoderm. In addition large round or polyhedral cells of embryonal type may partly or wholly enter into the tumor structure.

While the sex cells are potentially capable of producing any or all of the tissues derived from the three germinal layers, the resulting tumors when examined are found to consist of some predominating element. The rule seems to be that one constituent outstrips the others in rate of growth and a one-sided development occurs. Even so, fragments of tissue of various types may often be recognized scattered here and there throughout the tumor mass.

Every feature of the natural history of the disease is dependent upon the types of tissue composing the primary tumor. Usually embryonal elements predominate, develop locally with some rapidity and metastasize early. At the other extreme are the more rare tumors composed entirely of adult structures. These have been known to remain localized for many years.

The spread of metastases may occur along three routes:

1. The inguinal nodes may show involvement. This is rare except in those far advanced cases in which the integument of the scrotum has become involved.

2. The lymphatics of the spermatic chain form the most common pathway for the disease to advance. The nodes of this group are situated in the pelvis and along the lumbar spine between the bifurcation of the aorta and the renal pedicle. They are the lowermost nodes of the prevertebral system, drainage being continuous upward through the mediastinum and thence accompanying the thoracic duct to the left supraclavicular fossa.

The lumbar nodes as a rule are involved in the earliest metastases. The most frequent site for a palpable tumor is just lateral to the rectus muscle of the same side as the primary tumor and at the level of the umbilicus, though often the mass extends considerably higher.

3. Along with increase in size of the tumor there is often a dilatation of the veins of the spermatic cord. Perhaps this is a reason for the rather frequent metastases through venous channels which are found most commonly in the lungs. The roentgen-ray picture of this condition is characteristic, the lungs being mottled with perfectly round deposits of various sizes. Venous metastases have also invaded the liver, brain, kidneys, and stomach.

SYMPTOMATOLOGY

The first symptom noted by 92 per cent of the patients was an increase in the size of the testis, usually without any apparent cause. Subsequently the tumor increased in size, and in addition the following conditions arose: loss of weight, cramp-like pain

in the lower abdomen, pain in the back, indigestion, loss of strength, tumor in the lower abdomen, constipation, tenderness of the testis, swelling of a lower limb, a mass in the epigastrium, a swelling in the left side of the neck, and vomiting.

The earliest manifestation of the disease is remarkably clear cut. The tumor usually grows steadily, though occasionally there is a temporary but definite cessation of growth activities. The patient usually seeks medical advice at a time when the tumor is not of very large dimensions. Before long other symptoms arise, the greater number of which are caused by metastases. It is not at all unusual for these secondary manifestations to become of such an urgent character as to completely overshadow the symptoms of the primary tumor.

DIAGNOSIS

In a disease which progresses so rapidly to a fatal issue it is of the greatest importance that a correct diagnosis be made promptly. It is noteworthy that of our patients 43 per cent consulted physicians within a month of the time the first symptom was discovered; 70 per cent sought medical advice within the first six months of the disease. However, the correct diagnosis was so rarely made, and for this reason so much time was lost with ineffective treatment that when first seen at the Memorial Hospital only 11 per cent could be classified as free from metastases or local recurrences.

The diagnosis of teratoma testis is not an easy one but it would be made with greater frequency if physicians examined scrotal tumors with the possibility of cancer in mind. In every case of testicular tumor the abdomen of the same side should be palpated, and conversely, whenever symptoms or signs of a retroperitoneal tumor arise, the scrotal contents should be examined carefully.

Teratoid tumors of the testis must be differentiated from all other intrascrotal swellings, but the diseases which resemble them most closely are gumma of the testis, tuberculosis of the epididymis, and hydrocele.

When seen early in the course of the disease the patient is a man usually under forty years of age. He complains of a painless swelling of the testis. Inspection reveals a unilateral enlargement without any inflammatory involvement of the skin. There is no apparent retraction or shortening of the penis as is seen so frequently with a hydrocele, due to a puffing of the skin at the base of the penis. Examination with transmitted light reveals the solid nature of the tumor. Palpation discloses a testicular tumor, the epididymis rarely being involved. The shape of a normal testis is usually maintained owing to the density of the tunica albuginea. The consistence in general is firm but on account of variability in the make-up of the tumor some portions may be stony hard, indicating cartilage or bone, while elsewhere the fingers may sink into cystic depressions. In some cases fluid is present within the tunica vaginalis and the examination is rendered more difficult. This fluid may be aspirated without danger if care be taken not to puncture the tunica albuginea. At the upper limit of the tumor usually there is a well-defined line of demarcation and an apparently normal spermatic cord may be palpated. The patient seldom complains during this examination. Even a purposeful squeeze rarely elicits pain.

After the details of the primary tumor have been ascertained, the examiner should palpate the abdomen, especially of the same side, and the left supraclavicular fossa. A pelvic examination per rectum also is necessary.

The abdominal metastases are deeply situated. They feel rounded, solid, and immovable, although sometimes they pulsate with the aorta. They do not conform to the shape of renal or splenic tumors, and cannot be grasped bimanually owing to their fixed retroperitoneal position. Tympany by percussion may be elicited over these masses and if, on the left side, inflation of the stomach covers the swelling.

Gumma of the testis often cannot be differentiated from an embryonal teratoma by the sense of touch. Clues as to the true nature of the condition may be obtained from the patient's history, but we rely especially upon the Wassermann test. With gumma a positive report is almost invariable.

Tuberculosis is predominantly a disease of the epididymis, and palpation of the prostate and seminal vesicles usually clinches the diagnosis.

In addition to a thorough physical examination, a roentgenogram of the chest always should be made in search of metastases in the lungs or mediastinum.

If all other diagnostic measures have been exhausted and doubt still exists concerning the nature of the tumor, it should be subjected to a therapeutic test. An erythema dose of high voltage roentgen rays causes a rapid regression in the size of the great majority of teratomas, but if the tumor is made up of adult tissues there is no response.

TREATMENT

A large majority of the teratoid tumors of the testis are composed of embryonal tissue. Owing to the extremely malignant character of this tissue, surgery alone is followed by a high percentage of failures. On the other hand, because of the undifferentiated nature of these cells, the tumors are especially sensitive to irradiation.

Given a patient with a primary tumor and no signs of metastases, we would follow the following line of treatment:

A. To the tumor: (1) radium pack* of 9,000 mc. hrs. at 6 cm. distance using as filters ½ mm. silver and 1 mm. of brass. This is followed in three to four days by (2) high voltage roentgen ray, employing as factors 320 milliampere minutes, a focal distance of 50 cm. and filters of ½ mm. copper and 1 mm. of aluminum. The effects are watched carefully and at the end of about four weeks the tumor is removed intact.

* A radium pack is a container for emanation tubes, the side overlying the tumor being constructed of brass 1 mm. in thickness.

B. To the abdomen of the same side: (1) anteriorly, (a) a radium pack of 20,000 mc. hrs. at 10 cm. distance, filtered through ½ mm. of silver and 1 mm. of brass; (b) high voltage roentgen ray of 240 ma. minutes at 50 cm. distance, with a filter of ½ mm. copper and 1 mm. of aluminum; (2) posteriorly, high voltage roentgen ray giving 320 ma. min. at 50 cm. distance, filtered through ½ mm. of copper and 1 mm. of aluminum. Usually this procedure is repeated two or three times at intervals of three to four months even when no signs of tumor are present.

The histological picture of a thoroughly irradiated cellular carcinoma is most interesting. Frequently tissue destruction has progressed so far that grossly there is a close resemblance to a gumma. The microscope reveals much perivascular infiltration by lymphocytes and plasma cells; there are foci of necrosis surrounded by large polyhedral cells, also giant cells lying in small groups of lymphocytes. The cancer cells often are transformed into large polyhedral cells with hyperchromatic nuclei and are surrounded by lymphocytes.

We never operate upon a metastatic tumor. If metastases have developed sufficiently to give symptoms or signs they can not be removed entirely, while if they are not present there is no reason for subjecting the patient to a hazardous procedure. Thorough external irradiation preferably with a combination of the radium pack and the high voltage roentgen ray is highly efficient and has caused no mortality. We accept all patients and treat them no matter how far the disease has progressed. Some striking results have been obtained in individuals suffering from multiple lung metastases. We find that these tumors respond to irradiation as readily as other metastases. In spite of the fact that these men are quite weak, we have seen no prostration that could be attributed to the treatment.

RESULTS

In estimating our results we employ the same grouping that is used in classifying

the patients at the time of their first examination.

Group 1. *Primary Operable.* These patients had not been operated upon and no signs of an extension of the disease beyond the testis could be found. There were 13 patients. Of these, 9 or 69 per cent are known to be living, 1, 6 months; 2, 12–18 months; 3, 18–24 months; 1, 24–30 months; 1, 30–36 months; and 1, 5 years and 1 month respectively after the first irradiation. One patient died 12–18 months after admission. Three patients are lost. When last seen they were free from disease, 1, 12–18 months; 1, 18–24 months; and 1, 4 years after the first treatment.

Group 2. *Primary Inoperable.* These patients had not been operated upon, but at the time of admission presented the physical signs of metastases in addition to the primary tumor. There were 16 patients. Of these 4, or 25 per cent are living and well, 1, 6–12 months; 1, 2 years and 6 months; 1, 3 years and 10 months; and 1, 5 years and 5 months respectively after the first irradiation.

Group 3. *Recurrent Operable.* These patients were referred to the Memorial Hospital following orchidectomy. Local recurrences were present which were considered operable. However, an operation was performed in only one case. Irradiation alone caused the other tumors to disappear. There were three patients. All of them, or 100 per cent, are living and free from disease, 1, 3 years; 1, 4 years and 2 months; and 1, 10 years respectively after the first treatment.

Group 4. *Recurrent Inoperable.* These patients were referred after orchidectomy had been performed. They were suffering from inoperable local recurrences, inoperable metastases or both. There were 81 patients; 26 or 33 per cent are known to be living, 53 or 66 per cent are classified as dead although 7 of these were disease free when they were lost from our follow up service. The living patients have survived 3, 3–6 months; 3, 6–9 months; 4, 9–12 months; 3, 12–18 months; 3, 18–24 months; 1, 24–28 months; 2, 32–36 months; 1, 3 years and 4 months; 1, 4 years and 3 months; 1, 5 years; 1, 5 years and 11 months; 2, 8 years and 4 months; and 1, 9 years and 3 months respectively after the first irradiation.

Group 5. *For Postoperative Prophylactic Treatment.* These patients were referred soon after an orchidectomy, and no recurrences or metastases could be found. There were 11 patients. Of these 8 or 72 per cent are living, 2, 6 months; 1, 12–18 months; 1, 18–24 months; 2, 24–28 months; 1, 6 years and 2 months; and 1, 9 years and 8 months respectively after the first irradiation.

Lack of time prevents any extended comments upon these results. However, it may be suggested that even though irradiation therapy is as yet in its infancy, it is by far the most valuable therapeutic agent in the management of teratoid tumors of the testis and their metastases.

The writer wishes to express his appreciation of the generosity of his colleagues of the Memorial Hospital, who permitted a free use of the case histories of their private patients.

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CALCULOUS OBSTRUCTION

IN TWO CASES OF DOUBLE URETER

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OF renoureteral anomalies that of a double ureter is probably the most common. From a cursory review of the literature it would seem, however, that the presence of a stone in one of the ureters on the doubled side is a rare occurrence. Bransford Lewis reported* a case in 1922, and in our own series of three hundred and fifty-five cases of stone in the ureter, two such anomalies were encountered.

These cases are reported here because they bring out an important point, probably not brought out before, in the interpretation of roentgenographic shadows in the line of the ureteral tract. It may be readily seen that if a double ureter is not recognized in the course of a cystoscopic examination and a catheter passed into a ureter not containing the stone, the finding of a shadow produced by the stone in the other ureter at some distance from the course of the opaque catheter may lead one to the erroneous impression that it is extraureteral (Fig. 4). On the other hand the persistence of symptoms after the removal of the stone (as in one of our cases) may find its explanation in a lesion in an accessory ureter, the presence of which was not recognized previously.

In some of my earlier films showing what appeared to be extraureteral shadows on the same side where the symptoms pointed to a ureteral tract lesion, the close resemblance of some of these shadows to those of true stones made me somewhat suspicious that I might have overlooked a supernumerary ureter. Since my experience with the first case reported here, I have employed the routine injection of indigo carmine in practically all cases. While the injection of this dye is of great aid, too much reliance, however, should not be placed on this procedure, since in the presence of an obstructive lesion in the ureter or profound destructive changes in the kidney, elimination of the dye may not be forthcoming.

* LEWIS, BRANSFORD. A new sign in the diagnosis of ureteral stones. *J. Urol.*, 7:487, 1922.

CASE REPORTS

CASE 1. R. F., a girl twenty years of age, consulted me on July 16, 1923.

Previous history: Typhoid fever seven years ago; otherwise irrelevant.

Present illness: About one year ago the patient was seized with an attack of severe pain in the left lower abdominal quadrant, radiating backwards to the costovertebral angle and downwards into the vulva. The pain lasted a few days and was accompanied by nausea, much vomiting and painful urination. Had similar attack four months ago and again one week ago.

The cystoscopic investigation showed the presence of an obstruction in the left ureter, two centimeters above the bladder. It was with great difficulty that a No. 5 Charriere olive-tip catheter passed by the obstruction. The urine from the left kidney was obtained in a somewhat rapid flow; on microscopic examination it was found to contain many pus cells. The roentgenogram with a shadowgraph catheter disclosed an oval shadow, measuring 5 by 8 mm. in close contact with the opaque catheter in the lower end of the left ureter. (Figs. 1 and 2). A double exposure film showed the relation of the shadow to the catheter to be the same on both exposures. The left kidney was somewhat enlarged.

The case proved to be somewhat stubborn and it required ten cystoscopic treatments before the stone was coaxed out. The orifice was slit with scissors and the ureter was dilated with tunneled bougies and indwelling catheters and on several occasions hot olive oil and papaverine were injected. At the last cysto-

scopic sitting the stone was actually seen to protrude from the orifice, from which it was removed by grasping it with forceps. The stone was found to be channelled on one side.

The patient was seen again October 13, 1923. This time she complained of pain in the right kidney region. The roentgenogram showed the presence of three small shadows in the course of the right ureter between the transverse processes of the second and third lumbar vertebrae. When a catheter was passed into the right ureter obstructions were encountered at 14 cm. and again at 19 cm. which were overcome with the aid of papaverine and olive oil.

On November 1, 1923, a large sized catheter could be passed into the right ureter without meeting any obstruction and the roentgenographic examination no longer showed the former shadow. The patient evidently passed the stones.

I saw the patient again ten months later (September 3, 1924). She complained of pain in both costovertebral angles, mostly on the left side. The examination of the urine was negative. A roentgenogram of the urinary tract did not show any stone shadows. A large sized catheter was passed to the left kidney without any obstruction. The wax tip was negative for scratch marks. The left pyeloureterogram showed a slight dilatation of the pelvis; otherwise it was negative. Some of the solution escaped into the bladder.

A month later a pyeloureterogram on the right side showed a moderate dilatation of the pelvis and at Young's angle there was a fusiform dilatation of the ureter, extending for

Fig. 1. A stone shadow in the lower end of the left ureter in Case 1.

Fig. 2. Same case, showing an opaque catheter in close contact with the stone shadow. The stone was apparently pushed up for a short distance.

8 cm. There was no reflux of the opaque solution into the bladder. The right ureter was gradually dilated until on November 11, 1924, a No. 10 Charriere catheter could be passed up to the kidney with comparative ease.

The patient was seen again on Dec. 9, 1925. She had been married for five months and was doing well until two months ago.

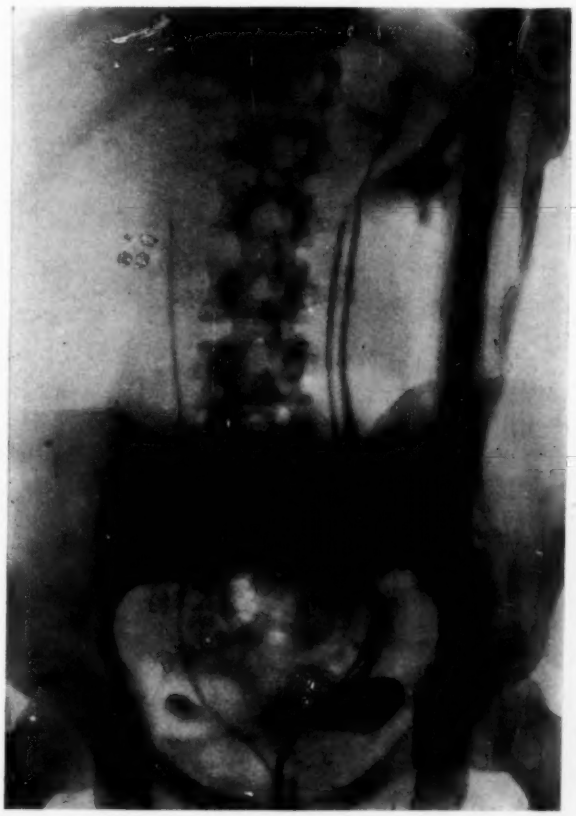

FIG. 3. Same case. Left pyeloureterogram showing a double pelvis and double ureter. Note the rudimentary character of the left upper pelvis (drained by the lower orifice).

Urinalysis and roentgen-ray examination of the urinary tract were negative. Rectal examination showed that the uterus was normal. No cystoscopic investigation was undertaken at this time.

On Dec. 21, 1925 the patient reported to my office again, complaining of attacks of severe pain in the left kidney region. This time, on cystoscopic examination, in the line below the left ureteral orifice and so near the neck of the bladder that it was almost within the posterior urethra, a very small knob-like elevation was noted, which would probably have been entirely overlooked if I had not happened to use a near-vision cystoscope. This elevation was probed with a catheter and was found to be a minute fold of mucosa, capping what appeared to be another ureteral orifice on the left side. The right side was carefully searched for a supernumerary orifice but none was found. Indigo carmine was injected intravenously and appeared at the end of five minutes from the upper left orifice and at the end of eight minutes from the lower left orifice. On the right side it appeared at the end of six minutes. The concentration of the dye was good from all of the three orifices, although it was somewhat diminished in the urine escaping from the lower left opening. Catheters

FIG. 4. Case 11. A composite picture showing a shadow separated from the course of the left ureter, outlined by opaque solution. The shadow could erroneously be considered extraureteral if the presence of an accessory ureter on the same side was not recognized on cystoscopic examination. The rudimentary character of the pelvis should suggest the presence of a double pelvis and ureter.

were passed into all of the ureters. Six c.c. of umbrenol were injected through the left upper catheter. The capacity of the accessory pelvis, drained by the other ureter, must have been very small as the injection of 1½ c.c. of the opaque solution produced intense pain. The pyelogram showed the presence of a double pelvis and a double ureter on the left side. The pelvis drained by the lower orifice was rudimentary (Fig. 3).

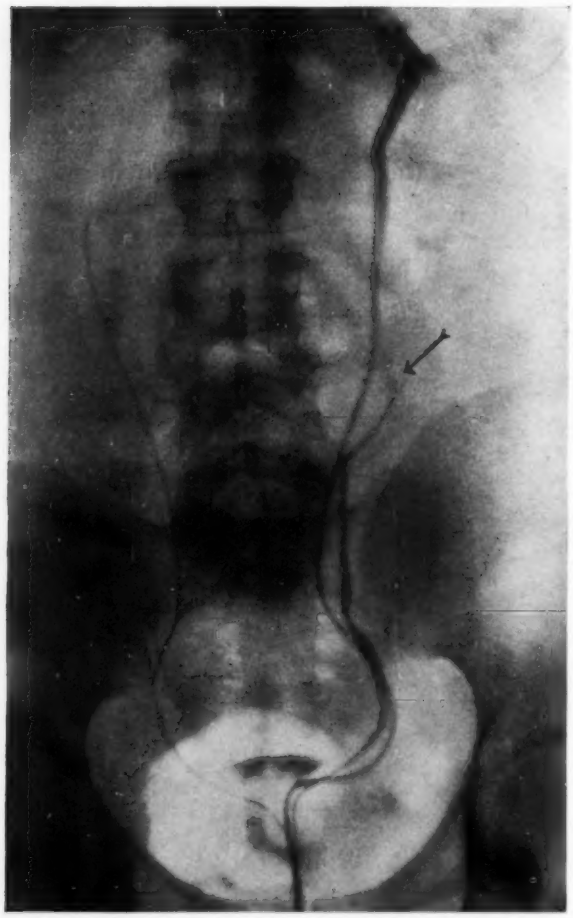

Fig. 5. Same case, showing a double ureter on the affected side, one of which (drained by the upper orifice) is blocked by a stone. Note that the tip of the catheter is in close contact with the shadow seen on the plain roentgenogram; the complete obstruction is indicated by the fact that not a trace of the opaque solution filtered beyond the stone shadow. The accessory ureter with the rudimentary pelvis is fully outlined.

The knob-like projection of the mucosa capping the orifice was fulgurated and the ureter which was drained by the left lower orifice was gradually dilated until a No. 11 Garceau catheter was passed with great ease way up to the left kidney on January 27, 1926. Since then the patient has been entirely free of symptoms.

Resumé of the Case

The patient has been under observation for fully two and a half years, during which period she had been cystoscoped seventeen times before the presence of a supernumerary ureter on the left side was recognized. The unusually low position of the accessory orifice and the fold of mucous membrane hiding the opening from plain view were the factors responsible for the failure to recognize the presence of the double ureter on repeated cystoscopic examinations. Had indigo carmine been injected earlier, the recognition of the anomaly would probably have been an easy matter. The persistence of symptoms on the left side after the removal of the stone either was due to the presence of a small calculus in the accessory ureter, as the patient showed a distinct tendency to the formation of stones, or was perhaps in some way associated with the knob-like projection of the mucous membrane capping the orifice, which may very well have interfered with drainage. The capacity of the accessory pelvis was so small that slight obstructive causes could have produced pelvic distension and pain. Whatever was the cause, complete disappearance of all symptoms followed desiccation of the knob-like projection covering the orifice and dilatation of the ureter.

Case 11. Male, musician, thirty, married, was referred to me by Dr. S. Hyrkin on September 29, 1927. Previous history was negative. Present illness began gradually seven days ago with dull and intermittent pain in the left flank and left costovertebral angle. The pain was localized and was not associated with nausea and vomiting or symptoms of vesical irritability. The urinalysis showed the presence of red blood cells. Four days ago the patient was suddenly seized with severe agonizing pain associated with great prostration.

The patient was seen during an attack of severe renal colic. On examination excruciating tenderness was elicited over the left kidney region. The kidneys were not palpable. The plain roentgenogram of the urinary tract showed an irregularly oval shadow with serrated border, measuring 8 to 13 mm. at the level of the transverse process of the fourth

lumbar vertebra. The left kidney appeared to be enlarged. The examination of the urine showed three to five red blood cells to a field and an occasional clump of pus cells. Cystoscopy revealed the presence of one ureteral orifice on the right side and two orifices on the left side. Indigo carmine was injected intravenously and the dye appeared in forcible deep blue jets from the right and from the lower left orifices. Not a trace of the dye had appeared from the upper left orifice at the end of fifteen minutes. A catheter was passed to the right kidney without obstruction and on passing a No. 6 Charriere catheter into the upper left ureter an unsurmountable obstruction was encountered at 19 cm. A catheter was passed without any obstruction into the lower left ureter. An opaque solution was injected through both catheters on the left side and the resulting pyeloureterogram showed the presence of a double ureter on the left side (Fig. 5). The shadow noted on the plain roentgenogram was apparently a stone impacted in the ureter drained by the upper orifice. Evidently the impaction was complete, as not a trace of the blue dye escaped from the orifice and no urine was collected through the catheter.

Because the calculus was situated high in the ureter and because of its large size and complete impaction, I suggested to the patient that he may have to undergo an open operation to have the stone removed. Since then he has been free of attacks and still refuses to consider an operation.

CONCLUSIONS

1. A shadow noted on the roentgenogram to be separated from the course of an opaque catheter or ureter outlined by opaque solution, may still be that of a true stone shadow lodged in an accessory ureter on the same side, overlooked in the course of a cystoscopic examination.

2. Persistence of the symptoms on the same side from which a ureteral stone was removed may be due to a lesion in another ureter which was not recognized on cystoscopic examination.

3. The injection of indigo carmine as a routine procedure is of great aid but too much reliance should not be placed on the dye, since in the presence of complete calculous impaction in the ureter or extensive destructive changes in the kidney, elimination of the dye may not be forthcoming.

CANCER OF THE CERVIX

HYSTERECTOMY VERSUS RADIATION

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FIFTEEN years ago panhysterectomy appeared to solve satisfactorily the question of the proper treatment of cancer of the cervix. Now again the problem comes before us and we are asked to decide if we are to give up the scalpel and take up radium therapy in its stead. Those of my generation who in the past have taken part in the work of perfecting the technique of hysterectomy are happy to welcome the new treatment if it is proved that the use of radium will make us masters of cancer of the cervix. We shall acquiesce as we have in the case of the serum of Behring and Roux which put an end to tracheotomy in diphtheria. But we are not yet at this stage of certainty of security; surgery still has its indications in incontestable cases.

The point of difficulty is to limit exactly the clinical category of cases "favorable for operation," that is to say, those which belong properly to surgery. There is no doubt that the results of radium therapy, up to now unchallenged, have considerably modified our views and curtailed the scope of operations on cancer of the cervix. Less than ten years ago, due to the technical perfections of panhysterectomy and the absence of any other means of cure, our aim was to increase the number of operations to the maximum. Wertheim operated upon 62 per cent; Hofmeier, 52 per cent; Zweifel, 65 per cent; Kronig, 77 per cent. In his second series at Heidelberg, von Rosthorn achieved the record of operating on almost 89 per cent of cases. At the present time, despite the anticancer propoganda which should have increased the percentage of early diagnoses and therefore that of operable cases, we must admit that our operative radicalism has noticeably bowed before the effective competition of radium therapy, and that the proportion of operations has notably decreased. Doderlein, who previously operated on 53 to 75 per cent, now does so on no more than 19 per cent; Beuttner has gone from 38 to 14 per cent, and even to 6 per cent in his second series. Regaud judged as operable only 44 cases in 373, that is, 11.8 per cent. What is the significance of this decrease in the proportion of cases operated on? To a certain degree it depends on the increase of cancer cases by the circumstances of war, the inroads on health, perhaps even an actual increase in the frequency and severity of cases. But this decrease is due above all to our narrowing the field of our intervention, and as Regaud puts it, modifying the criteria of operability generally admitted up to the present.

The criteria for classifying a case as operable are mobile uterus, vaginal fornices pliant and not invaded, and parametrium not infiltrated even in the portion adjacent to the uterus. The primary clinical sign is the degree of mobility of the uterus, which must be verified with care. The mobility must be complete. When the uterus is already partially immobilized by an infiltrated ligamentary support, one must expect to find the lesions extended further than one originally counted on. In which direction is the vaginal vault involved and is it a surface involvement (still compatable with operation), or is it a deep and fixed infiltration which is a contraindication to operation? Has the vesicovaginal and perirectal tissues their normal elasticity or are they already infiltrated? Is there spreading toward the uterosacral ligaments? Is the parametrium infiltrated

and does the infiltration extend to the outside juxtaparietal limits of the parametrium? These are the points which it is necessary to determine by methodical palpation in the region about the cervix in order to recognize the exact vaginal limits of the neoplasm, to find if it be a crater ulceration which grooves the vagina in cases of endocervical cancer, an irregular and ulcerated collar representing the cervical lips, or a cauliflower growth which reaches to the bottom of the vagina in the case of vegetative cancer of the vaginal portion. Careful search is to be made for induration of the ligamentary supports by inserting the index finger in the depths of the lateral fornix and going upward and backward to the pelvic wall, in combination with abdominal palpation which dips toward the sacral hollow. The rectal examination is not to be neglected. This is a complementary exploration which gives valuable information. Lightly and deeply applied it gives exact knowledge of the involvement of the rectovaginal wall, of the pouch of Douglas, of the posterior surface of this structure and the outer portions of the parametrium.

With these severe and restrictive conditions for choosing, which make the degree of mobility of the uterus the criterion of operability, this group of cases "favorable for operation" becomes a minority. It is represented by only 44 cases of 373 observed by Regaud; 74 of 282 cases of Bumm's; 40 of 205 cases of Doderlein's, being a proportion which is less than one fifth of the patients treated. This proportion fell to 6 per cent in a second series of Beuttner's. Of 117 cases observed in 1920 at his clinic in Vienna, Frankl treated 9 per cent at onset. Our own percentage is 8 per cent. It is to be hoped, however, that this clinical group will be augmented in the future. Progress lies in the hands of the medical profession and propoganda among the general population may also change the aspect of this problem. A time will come when physicians, midwives, and patients stimulated by a methodical and persistant campaign will give us the means of treating cancer of the cervix nearer and nearer its onset, with the best chances of a radical cure. But we are still far from this era of early diagnosis and in the meantime it is necessary always to take account of the case with insidious development, with mild symptoms and to take account of prejudices and negligence.

In favorable cases which furnish a considerable number of definite cures with a very low risk of operative fatality (less than 3 per cent in the present statistics of J. L. Faure, according to the systematization of Mikulicz), we believe we have the right, until new indications arise, to continue to prefer extensive and well-executed hysterectomy to radium therapy alone. To give up operation it is necessary that there be demonstrated an equivalent series of these operable cases of similar clinical and anatomical conditions, followed for a sufficient length of time, which by radium therapy alone give as many and as stable cures as does operation.

The value of radium therapy alone has not yet been decisively demonstrated. In comparison with the abundant statistics on operations, we can present for radium therapy only very small series observed over a very short period of time. Doderlein claims the highest percentage of cures, registering as cured after observation for four to five years 19 cases out of 40 carefully chosen and very favorable operable cases, that is, 47.5 per cent. The statistics of Schäfer very clearly present the results in the clinic of Bumm; of 74 cases of operable cancer treated with radium, 30 showed permanent cures on re-examination five years later, a percentage of 40 per cent. The important contribution of Eymer in 1926 records for operable cases apparently permanent cures five years after in 55 per cent of cases. Beuttner also noted a favorable percentage of 44 per cent cures followed for periods of five or eight years, but the series was a small one of 9 cases. Regaud in 22 operable cases (or in such as hysterectomy did not seem tech-

nically impossible), observed five to six years after radium therapy, records a proportion of cures of 27 per cent. Of 42 cases followed for four or five years there was almost 24 per cent cures; of 28 cases followed for three years, 42.8 per cent. Kelin (10 cures in 20 cases) and Weinbrenner (3 in 6 cases) observed only small series. The figures of Franz (14 cures in 45 cases treated with radium therapy) and of Baisch are even less favorable and claim cures in only one-third of their cases.

More and more even those who do not themselves operate, recognize that there is a group of operable cases which surgery cures better than does radium therapy. Regaud places in this group, in which the indications for operation are incontestable, the following:

1. The epitheliomas which do not have an epidermal origin: adenocarcinomas, basal-cell epitheliomas and various atypical epitheliomas. This group, made up of neoplasms only slightly sensitive to radium, includes only about 5 per cent of the cancers of the cervix.

2. The cancers, whatever be their histologic form, with which there coexists an old or recent adnexal inflammation. It is known that by treating these with radiation one exposes the patient to serious septic complications, and that besides infection is a factor in resistance to radioactivity.

3. Those cases which fail to respond to radium therapeutic treatment, still operable. In our own compilations we found from 5 to 10 per cent of all cases in which the correct technique did not succeed in curing the cancer locally. After a period of cicatrization lasting several months, the cancer reappeared at its former site. Such cancers are thus refractory. Among them there are also some cases in which the histology cannot explain the resistance to radium therapy.

It seems to us premature and unsound to declare as does Treber, following the results of Klein at Munich, that "we obtain fewer cures by operation in operable cases than by radiation alone." It is equally unsound to conclude as Doderlein did not fear to do at the Congress of Innsbruck in 1921 that "all cancers of the cervix that can be cured by an operation can also be cured by radiation." It is necessary, as a matter of fact, to compare equivalent clinical series and not haphazardly to put together all cases, good and bad. For if we limit ourselves to cases in which the cancer is really just beginning, permanent postoperative cures definitely range higher than the averages of 40 to 45 per cent which are the present percentages of cures by radium. Wille in 1927 indicated a proportion of 56 per cent of permanent cures in the fifth year for cases operated in 1920 at the clinic of Franz. Bonney reports a proportion of 54 per cent. I estimate a percentage of 52 per cent for the period from 1919 to 1921. J. L. Faure estimates that 80 to 90 per cent of cases of this type operated on remain cured. Accepting this as an exceptionally happy series, it is nevertheless a very encouraging figure for surgery.

The principal argument invoked by Bumm, Seitz and Kronig, who have already taken the step and have stopped operating and use radium therapy even in operable cases, is of serious import and capable of impressing those concerned, namely, the very small mortality from treatment by radium. Despite all technical progress the risk in operations persists. J. L. Faure estimates that the mortality in hysterectomy for beginning cancer with a mobile uterus and with flexible fornices does not pass 5 per cent. It is about 6 per cent in our most recent series of cases of this type. This is also the figure of primary mortality of Kubinyi and of Bumm. Süssman claims to have gone down to 3 per cent. Without doubt it must be said, with J. L. Faure, that the seriousness of the operation is for the most part a function of the technical excellence and experience of the surgeon, and that those who are not equipped for this operation should leave it to others or take up the

use of radium. The danger which we can diminish is that of infection. Preparatory antisepsis, a cleansing curettage, local application of vaccines and operative technical precautions have all notably reduced the risk of peritoneal contamination. Preoperative use of radium is also a good means of making the cancerous cervix aseptic. But there are chances of death which remain and over which we have no effective control, such are embolism and cardiopulmonary complications. It is this irreducible mortality which weighs the balance in favor of radium therapy.

It appears, until new technical progress is made in radium therapy, that for this type of operable case surgery retains a superiority with regard to permanent cures. The quality of the operative cure seems higher. An important point, which I was the first to note and of which I find new proof in the statistical study of Schäfer, is brought out in the comparative study of figures for a continuous period of time. Thus if one makes the first observations after three years, the results of radium therapy are as good as those of operation; if the cases are examined after a lapse of five years, the results of radium appear less satisfactory than those of hysterectomy. In the fifth year after treatment by radium only 9 out of 36 operable cases were living, whereas in a similar series treated by operation the number surviving was 15, this being the lowest figure of survival, a difference of almost one-third against radium therapy. It seems then that the occurrence of these late relapses after the third year is more frequent after radium therapy than after operation. With radium there is the danger of leaving latent cancer cells at a distance beyond the area reached by the rays, especially in the parametrium and sometimes in the iliac ganglia. These latent cells explain the belated recurrences. Of 10 cases in which the uterus was removed after preoperative irradiation, only two were found microscopically to be free of cancer. All the others showed neoplastic elements in the walls of the cervix and in the parametrium. Gosset indicates that in one series of 30 cases in which the uterus was irradiated he found 8 with neoplastic cells. In a new series he found 9 cases.

When we are dealing with a beginning case which appears definitely operable from both the technical point of view (mobile uterus, flexible vaginal fornices) and the clinical point of view (no contraindication in the state of the patient), we believe that panhysterectomy offers advantages which compensate for the operative risk. Should these cases be reserved for surgery alone or is it preferable, as Regaud and Proust believe, to employ preparatory radium therapy before the hysterectomy? This second proposition is logical and carries an additional factor of safety in that it sterilizes the cervicovaginal passage. But in these favorable cases it seems to us that one can and should remain in the domain of surgery alone. In practice this supplementary preoperative radium therapy presents one of two difficulties: the patient who has submitted to treatment by radium therapy will have a tendency to be content with this treatment on account of the amelioration of symptoms, and if the patient be a private case, she may refuse to pay the expense of both radium therapy and surgery.

However, it is wise to remember that these conclusions are provisional and temporary, that tomorrow an improved technique may modify them, that progress is especially to be hoped for from radiation rather than from surgery which probably has reached its highest development. The future will perhaps show that even for these beginning cases, radium therapy will excel and that with the advantage of a negligible risk, it will produce as good results as surgery in equivalent cases.

CLASSIFICATION, SYMPTOMS, DIAGNOSIS AND TREATMENT OF ANORECTAL TUMORS

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ANORECTAL tumors vary greatly in location, appearance and structural composition.

They may be encountered superficially or deeper in tissues at the anus and may be situated within the anal canal or in the rectum proper.

There are several types of growths, tumors or swelling met with in the anorectal region, such as hemorrhoids (external and internal), hypertrophied anal papillae, procidentia recti, venereal warts (condylomata, single or in conglomerate masses), chronic inflammatory deposits, chronic fistulous tracts, parasitic infections, and encysted foreign bodies, enlargements that do not fall within the scope of this paper, the object of which is to deal with true growths of the terminal bowel.

True anorectal neoplasms may be benign or malignant, and one type is encountered about as frequently as the other in adults, but in children the former largely predominates.

BENIGN TUMORS AND CYSTS

Non-malignant tumors and cysts of the anorectal region may be congenital or acquired; they are encountered more often in women than men, and occur usually between the ages of twenty-five and forty-five; they are distributed in different countries and classes; they develop in various segments of the gastrointestinal tract, and may cause slight discomfort, considerable pain, or in rare instances may terminate fatally, being the result of exhaustion, infection, hemorrhage from the breaking or sloughing of tumor masses, or from intestinal obstruction.

Benign anorectal tumors grow slowly, involve superficial tunics of the bowel, do not infiltrate adjacent structures, are not complicated by rapid loss of weight, metastasis or cachexia, seldom recur when extirpated, possess a systematic cell arrangement and in the majority of instances are composed of connective, glandular, muscular or adipose tissue, alone or intermingled.

Sometimes apparently innocent neoplasms upon being sectioned prove to be benign at one and malignant at another point. Non-malignant growths occur throughout the gastrointestinal tract, but are met with in the rectum five times as often as in small intestine or colon, and may be disseminated over the mucosa from the ileocecal valve to the anus when tumors are more numerous and larger in the lower sigmoid and rectum.

Innocent tumors frequently degenerate into cancer owing to their construction and to the irritation to which they are subjected by cathartics, careless introduction of enema tubes, prostatic massage, intestinal discharges, passage of feces, instrumentation, employment of patent pile cures, contraction of anorectal muscles, and infective organisms.

Benign growths are not very common in children and are encountered most frequently in youngsters between eight and twelve years of age, though the writer has several times removed polyps from the anus or rectum of infants and children varying in age from two months to six years, as well as from young adults who suffered from coloproctitis, worms or chronic discharges.

Characteristics. All anorectal tumors

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having pedicles are called polyps, whether their distal extremity is pointed or enlarged; and since most benign tumors are pedunculated polypi and non-malignant neoplasms having pedicles are synonymous, the terms adenoma, lipoma, fibroma, myoma, lymphoma, myxoma, and angioma are employed to designate texture of the neoplasm.

Tumors having a broad infiltrated attachment or base are apt to be in the transitional stage or cancerous, and it is a fairly safe rule to consider new growths as benign so long as they possess a definite pedicle.

Originally benign tumors are ovoid or pyriform in shape, or extend at a right angle to the gut, but as they enlarge and develop a pedicle they droop into the bowel or extrude through the anus because of their weight, by being daily dragged down by feces, or having been caught and retained by the sphincter or levator-ani muscle during defecation. Pedicles continue to elongate as the tumor enlarges and is subject to increased trauma.

Non-malignant tumors may be single or multiple, large or small (raspberry to orange size); isolated or disseminated; soft, semi-solid or hard; fragile or tough; dark purple, reddish, pearl gray, or black (if strangulated) in color; located in the colon, sigmoid flexure, rectum or at the anus; retained above the sphincter or extruded through the anus; ovoid, round, pyriform, clubbed or cauliflower-like in shape; they may have a smooth, nodulated or ragged surface; they may have sessile or pedunculated attachment, and one or several may grow from a single stalk, appear as in individual neoplasms or like clusters of grapes, and partially or completely block the bowel.

Classification. Benign anorectal tumors may be composed of gland-adenoma, muscle-myoma, adipose-lipoma, lymphoid-lymphoma, connective-fibroma, cartilagenous-enchondroma, mucous-myxoma, osseous-osteoma, tegumentary-papilloma or other tissue of the rectum or perianal skin, together with blood and lymph vessels.

Adenomas are encountered more frequently than other anorectal tumors, may be single or multiple, located at the anus, in the rectum, sigmoid, colon, vagina or rectovaginal septum; they are variable in color, size, and contour, may or may not extrude through the anus, and remain innocent or degenerate into cancer. They may be soft or dense, pale or reddish in color, have smooth nodular or broken surface, and their pedicles narrow or flat, short or long. Tumors and polyps have incited tenesmus and have caused sphincteric contraction and induced more or less obstruction. Adenoma containing considerable fibrous, muscular, or lymphoid tissue is designated as adeno-fibroma, adeno-myoma, and adeno-lymphoma.

Usually glandular tubules are numerous, closely packed, encompassed by connective tissue. The epithelial covering consists of cuboid, cylindric cells. Sometimes glands atrophy or degenerate, leaving closed outlets or diminuitive caverns in tumors. Partial or extensive desquamation of epithelium may be observed in the neoplasm or stalk or both. A blood-tinted viscid secretion exudes from such areas which contains serum, leucocytes and eosiniphiles.

Adenomata may persist for years without undergoing malignancy, but the majority degenerate into cancer in from one to seven years, depending on the patient's vitality, degree of irriation, and upon the character of the tumor, for soft polyps more often undergo malignant changes than do fibro-adenoma.

Multiple adenomas (polyposis) are often confused with papillomas, which are smaller, devoid of pedicles, and develop superficially. These growths may be recent and ovoid, or older and be pedunculated in shape; frequently they are disseminated throughout the colon and rectum, causing irritating blood-tinted mucus discharge that incites tenesmus. In neglected cases complicated by extensive ulceration neoplasms become numerous and large causing

diarrhea, manifestations of obstruction and bleeding when detached. The writer has treated many such and in two instances where rectum and colon were excised both benign and malignant growths were observed side by side.

Adenomas are designated villous where their surface undergoes hyperplastic changes and they become fragile and break causing profuse bleeding.

Fibromas containing more or less gland or muscular tissue are occasionally encountered in the rectum or vicinity of the anus and may be seen as pedunculated or round nodular formations.

Lipomas, not uncommon in the perianal region, occasionally encroach upon the rectum where they become cystic or break down causing fistulae.

Myomas, angiomas, myxomas, enchondromas, lymphadenomas and osteomas are encountered rarely in the anorectal region and their further discussion will be omitted.

Congenital cystic tumors (dermoid) containing hair, teeth and other fetal elements are occasionally met with in the sacrococcygeal region. Smooth, globular cysts filled with sebaceous matter or degenerated fat tissue are occasionally encountered in the anorectal or perianal region.

Symptoms. The degree of discomfort incident to non-malignant tumors depend on their location, number and size, whether or not they protrude, extent of degeneration, and causative or complicating circumstances.

Large tumors induce pressure, obstruction and the feeling that the bowel is never emptied. Smaller neoplasms, such as polyps, incite tenesmus, muco-bloody discharge, frequent desire for an evacuation and tickling sensation in the anal canal. Loss of weight and cachexia are not apparent unless growths are multiple, ulceration is marked and diarrhea is distressing.

Diagnosis. With the aid of digital and proctoscopic examination there is no excuse for confusing benign growths with hemorrhoids, procidentia, large papillae, etc. When they are pedunculated and the rectum is not explored, they are at times mistaken for internal hemorrhoids and procidentia recti because they extrude through the anus, but upon inspection they are easily diagnosed because of the narrow elongated attachment.

Dermoids are differentiated by their sacral connection and other cysts by their smooth, soft or elastic feel.

Malignant growths are recognized by thin large, hard, nodular surface and their broad attachment.

Anal papillae are pyramidal in form, and hemorrhoids are detected by their globular contour, purplish hue and pliable consistence.

Treatment. A spontaneous cure of pedunculated non-malignant growths follows when they are broken off by feces during defecation, or when tumors are caught in the sphincter and amputated by pressure necrosis.

Low-lying growths in the anal canal or growths that extrude through the anus are easily removed by ligation and amputation. Pedicles may be crushed with an angiotribe, followed by excision. The growth may be clamped, cutting away the portion external to the clamp and cauterizing stump. The neoplasm may be excised by elliptic incisions about its attachment. The wound may be sutured and drained or permitted to heal by granulation.

High growths or polyps located in upper rectum and sigmoid are not accessible to the above procedures and must be destroyed or extirpated with pressure by forceps, snare, a Gant valve clamp attached to the tumor pedicle, by torsion, fulguration or excising the involved gut segment. Larger polyps in the upper rectum are most satisfactorily destroyed by seizing and clamping their attachment with pressure forceps through a large operating proctoscope, whose detachable handles are removed and the forceps left projecting through the anus.

The ligature is the operation of choice for growths within reach because it is

quick, safe and effective. Tumors having large tough pedicles are transfixed and doubly tied like thick piles because when they are encircled with a single thread, circulation may not be completely blocked and the ligature may fail to cut its way out, leaving the growth dangling. Hemorrhage occasionally ensues when the ligature slips from a short stump or when it has not been properly tied.

Fulguration and cauterization, using a regulated high frequency spark with aid of proctoscope, anoscope or slide speculum, is effective in this class of cases.

Some features of the fulgurating treatment of anorectal growths are attractive. It appeals to the patient by avoiding operation; it can be practised in the office; it is painless; it accomplishes a quick cure; it is not accompanied by hemorrhage or followed by the formation of cicatricial tissue.

When the spark does not touch normal mucosa, scars are avoided, for when treatment is confined to the tumor the growth shrinks or drops off without causing material change in the mucous membrane.

Occasionally tumors are satisfactorily removed through elliptic incisions and suture, or the wound is left to heal by granulation provided the anal canal is split and a drain is inserted to forestall infection.

Colectomy is indicated in aggravated cases of multiple adenomata (polyposis) not cured by irrigation and fulguration, and where tumors are undergoing malignant degeneration.

Inflammatory and ulcerative lesions which complicate tumors in the lower bowel are controllable in most instances by copious daily ichthyol, balsam of Peru, boric acid, or argyrol 4 per cent irrigations. When for any reason the solution cannot be made to reach all parts of the colon, appendicostomy or cecostomy is indicated that the colon and rectum may be frequently cleansed and medicated by thorough colonic irrigation.

Colostomy, ileostomy or short-circuiting (ileorectostomy or sigmoidostomy) is indicated in obstinate cases not curable by appendiceal or cecal irrigations, because the mucosa is so deplorably irritable, inflamed or ulcerated that colonic treatments are useless unless the bowel is put completely at rest by diverting feces from the irritated bowel.

MALIGNANT GROWTHS

Cancer is met with in all segments of the intestine but occurs with greatest frequency (80 per cent) in the lower sigmoid and rectum. Of 300 anorectal cancers examined by the writer, neoplasms were located in the ampulla in 50, upper rectum 20, rectosigmoidal juncture 15, anal canal 10, and at the anus in 5 per cent of cases.

There are many predisposing factors of malignancy, such as occupation, age, cicatrices, irritation, etc.

Table 1 gives an idea of the frequency with which rectal malignancy has been encountered at different ages in three hundred cases treated by the author.

Table 1

Frequency of Rectal Malignancy

Age	Cases
Under 20	10
20 to 25	9
25 to 30	12
30 to 35	29
35 to 40	28
40 to 45	34
45 to 50	42
50 to 55	39
55 to 60	36
60 to 65	32
65 to 70	19
70 to 80	10

Cancer is met with in this region more often in men than in women and in persons following sedentary occupations than in laborers.

Classification. Clinically there are three types of anorectal malignancy, epithelioma, carcinoma and sarcoma, of which the first and last are comparatively rare.

There are two distinct types of true epithelial malignancy: flat pavement-squamous celled epithelioma, and cylindric-columnar celled carcinoma. The

former occurs in the perianal skin or at the mucocutaneous juncture and the latter in the rectum proper, neoplasms that may extend in either direction.

Epithelioma begins either as a firm papillary excrescence or as an ulcer. The lesion shows as a wart-like nodule with indurated base and later tends to degenerate and forms sensitive ulcerated areas having reddish fluted borders. Epitheliomas may remain superficial or extend to deeper structures but are less malignant than carcinoma because of their slow growth, absence of cachexia, slight loss of weight and rareness of metastatic complications.

Carcinoma at the beginning simulates adenoma owing to the gland-like formation of the mass. These tumors are encountered in all parts of the rectum and higher up; they vary in size, contour and consistency (being hard and nodular, soft and fragile, or cauliflower-like in appearance); they may develop rapidly or slowly (soft medullary cancer, hard scirrhous cancer), and show a tendency to crater-like formations as tumor masses degenerate, accompanied by slight or profuse hemorrhage.

Carcinomas may involve adjacent or distant structures by direct extension or secondary glandular involvement, the tendency being to follow lymphatics and blood vessels. Occasionally colloid or gelatinous growths are rectal and excrete a glary mucus, but when they are from pigmentary deposits they are designated melanotic.

Malignant tumors of the sarcoma type are encountered early in life, may be single or multiple, are extrarectal, vascular, composed mainly of connective tissue cells, develop rapidly and show a marked tendency to recur.

The writer's 14 cases of colonic and anorectal sarcomas were located in these regions: colon, 1; sigmoid flexure, 1; rectum, 4; perianal region, 8.

These growths originate in perirectal structures, involve the anorectal region secondarily and are dense, small or large masses that seldom degenerate. Small, soft develop more rapidly than large, round tumors. When dark and pigmented they are designated melanotic but when they originate in lymph tissue are called lymphsarcoma.

Symptoms. Manifestations of cancer located in the rectum depend upon location, size of the growth and degeneration of the tumor.

In the beginning the patient realizes something is wrong but cannot point to definite symptoms. As the neoplasm becomes larger the sufferer complains of increasing constipation, sensation of weight and fullness in the bowel and feeling as if the rectum was never emptied. Later obstructive manifestations are present; there is alternating constipation with diarrhea, straining at stool, pressure pains, tympanites, malformed stools, and an abundant discharge composed of mucus, pus, and blood and tissue debris coming from crater-like ulcers formed in the degenerated growth. Eventually fecal impaction, loss of weight, cachexia, abdominal distension, pain in the back, hemorrhage and an offensive odor prevail. Frequently polyps, procidentia from straining, hemorrhage and perianal dermatitis incited by the discharge are complications. Epithelioma at the anus is accompanied by marked pain because the ulcerated area is traumatized during defecation and the disease involves hypersensitive perianal skin.

Diagnosis. In a patient complaining of the symptoms mentioned, diagnosis of anorectal carcinoma and sarcoma is easy because growths in all parts of the rectum are easily inspected through the proctoscope and their location and character easily diagnosed by digital examination.

Anorectal malignancy has most often been confused with hypertrophic tubercular masses, luetic gummata, cicatricial strictures and inflammatory deposits resulting from fistula or encysted foreign bodies, tumors of slow formation not complicated by cachexia, rapid loss of weight and the offensive odor characteristic of cancer.

Treatment. Conservative or non-curative measures may be employed to strengthen the patient, keep him comfortable, and prepare him for operation. In brief, palliative treatment consists in improving the general health, regulating diet, procuring comfortable evacuations, relieving suffering and insomnia, alleviating obstruction, treating the inflamed and ulcerated areas and dealing with complicating ailments.

Surgical palliative treatment such as dilation of involved bowel, proctotomy and colostomy are indicated in inoperable anorectal cancer to prevent obstruction, relieve gas pains and procure comfortable evacuations.

Of these the procedure of choice is colostomy because when a controllable artificial anus is established it forestalls obstruction and straining and diminishes suffering by permitting free evacuations without feces coming in contact with the diseased bowel and facilitates irrigation and treatment of malignant areas. Colostomy plus deep roentgenotherapy and keeping the gut clean often reduce the size of the neoplasm and prolong life for months or years.

In favorable cases the growth may be excised and the artificial anus subsequently closed.

In non-surgical curative treatment radium, roentgenotherapy, Percy's slow cooking procedure and caustic pastes have sometimes proven effective in selected cases, but the writer never employs them except when patients decline radical extirpation. Percy reports good results but I have been unable to cure patients with his method nor have I ever known of rectal cancer to be cured by radium or roentgen rays. Radiation and application of caustic pastes occasionally cure anal epithelioma but radium applied to rectal cancer always increases pain, because it induces acute proctitis and muscular spasm. Roentgentherapy is employed subsequently to colostomy and rectal extirpation to minimize distress and possibly eliminate wandering cells.

In radical surgical treatment extirpation of cancer is the only reliable method of treating growths located in the rectum proper. Favorable results following excision and resection for anorectal cancer largely depend on: (a) preoperative treatment to improve general health; (b) careful preparation of the patient for excision; (c) dexterity and skill of the surgeon; (d) protection of operative field by preliminary anal purse-string suture; (e) division of rectum by cautery between double ligatures or clamps; (f) replacing blunt with clean-cut dissection; (g) avoiding hemorrhage by ligating the main artery without interfering with nutrition; (h) mobilizing the gut by peritoneal incisions, preventing tension and sloughing; (i) widely removing lymph vessels and glands; (j) inserting anterior and posterior drains; (k) anchoring a tube in the rectum to permit feces and gas to escape, and (l) employing hyperdermoclysis or transfusion during or following operation when indicated.

Preparation of the patient consists of confining him to fluids, administration in castor oil followed by 5 per cent ichthyol colonic irrigations the day preceding operation, arresting peristalsis with small doses of opium the night before and flushing the colon with a 25 per cent peroxide of hydrogen solution three hours prior to his going to the operating room. Preliminary colostomy is performed only when there are dangerous obstructive symptoms.

The operation selected depends chiefly upon the location and size of the neoplasm. Resection is impracticable for rectal growths but useful for tumors situated in sigmoid and colon.

Based upon 350 personal operations and statistics of others, the writer estimates the mortality of rectocolonic excisions (including resections) as follows (per cent): colectomy, 15; abdominoperineal excision, 20; sacral excision, 10; vaginal excision, 7; perineal excision, 5.

Diminutive localized carcinomas and anal epithelioma may occasionally be removed by partial proctectomy (elliptic

incisions) but usually extirpation of the entire segment is indicated. The rectum may be extirpated by perineal, sacral, vaginal, or abdominoperineal excision (proctectomy).

I have completely discarded Kraske's sacral extirpation for the operation is prolonged, bloody, and often induces profound shock and suppression of urine, is followed by marked pain, lengthy convalescence and complete incontinence, establishes the anus at an inconvenient location, induces agonizing postoperative pain owing to connecting of scar tissue and hypersensitive skin covering the blunt sacral extremity.

Abdominoperineal extirpation (combined operation) has also been practically abandoned since neoplasms in any part of the rectum and lower third of the sigmoid can be quickly extirpated by an experienced proctologist without removing either sacral or coccygeal segments owing to free mobility of the lower bowel following circular incision at its peritoneal attachment which enables one to excise several inches of involved bowel together with connecting perirectal and pelvic glands.

Vaginal excision has also given place to perineal extirpation since sufficient room is obtained by the operation below described and splitting of the vagina frequently leaves the patient with a weakened perineum or a rectovaginal fistula. Little difficulty is experienced in freeing the vaginal septum from the rectum.

In my last fifty cases of anorectal cancer which varied in size and location I succeeded in removing all growths by the perineal route. In five instances where tumors were located in the lower sigmoid extirpation was not difficult owing to mobility of the gut following incision of the peritoneum.

Briefly stated advantages of perineal excision are: (a) the operation is performed quickly; (b) it causes little shock or bleeding; (c) it is followed by few postoperative complications; (d) the anus is left in the normal position; (e) mortality is approximately 5 per cent; and (f) danger of recurrence is minimized through the extirpation of perirectal glands located in the sigmoidal mesentery.

In fifty cases the average time required for extirpation was twenty-eight minutes and few complications were encountered.

Steps in perineal extirpation as practised by the writer are as follows: (a) the rectum is tightly closed with a purse-string suture; (b) surrounding skin and subcutaneous fat are severed by a circum-anal incision extending from the perineal center to the coccygeal tip behind; (c) muscles and ligamentous structures are hooked up with the finger and divided with scissors which frees the lower rectum; (d) discarding the knife and using blunt scissors and guiding finger tip the prostate is disconnected from the rectum, lateral ligaments and fascias are divided, the gut is separated from its sacral attachments and the peritoneum all around is quickly severed by a series of bold, quick scissor cuts which freely mobilize the gut; (e) bleeding is controlled by boiling water gauze packs, ligation of vessels being seldom required; (f) the rectum and sigmoid are drawn down, from 4 to 14 inches are amputated and the stump is ligated about a large rubber tube following cauterization; (g) gauze compresses are removed and the levator ani, fascia and ligaments are snugly sutured about the bowel following closure of the peritoneum with interrupted catgut sutures; (h) after interior and posterior drains have been inserted the distal end of the bowel is attached to perianal skin by interrupted linen stitches and the operation is completed by applying dressings and T-binder through which the rubber tube is left projecting.

In conclusion I wish to emphasize the many advantages of perineal over extirpation operations for anorectal cancer, especially the combined procedure which leaves the patient with a permanent artificial anus and the sacral operation which is brutal, causes profound shock and is accompanied and followed by many distressing complications.

ADJUSTABLE HAND AND FOOT EXTENSION APPLIANCES*

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PHILADELPHIA

EXTENSION upon the hand or foot to reduce fracture deformity is often very unsatisfactory, particularly if the fracture is near the joint, as in fractures of the lower third of the leg. The foot skate, Buck extension or, in a similar condition in the forearm, adhesive plaster to the hand, have their limitations. Whether it be a bandage loop around the part or an adhesive plaster, there is a corded pressure upon the soft tissues.

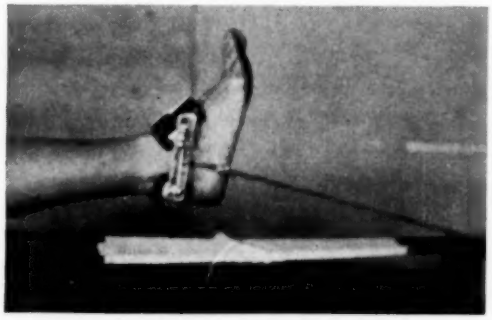

FIG. 1. Foot grip. Comfortable. Note the arch plate contacting with the leg; heel plate adjustable high or low on the heel.

With my own type of splints I have imbedded plates with projecting ends for the attachment of other splint pieces in a plaster slipper or a plaster glove. Where there is laceration of the parts, requiring dressings or surgical attention, a plaster cast covering the parts is not advisable.

To meet all these needs, I have devised the two appliances illustrated. The principles of operation of both are the same.

The instrument is best in two sizes, one for smaller children and the other for ages from about twelve years up. It can be slipped over the foot whether the foot is covered with a surgical dressing or is bare. The padded arch plate is adjusted to the dorsum of the foot well back to the rise of the leg. The heel plate is adjusted to set flat against the heel. It can be changed to different positions along the heel should the need arise. Tightening the wing nuts clamps the slotted plates against the respective padded plates and the whole becomes a rigid but a non-constricting and a non-slipping grip upon the foot and cannot be pulled off. There is no pressure upon the main vessels, so practically no circulatory obstruction.

FIG. 2. Hand grip without padding, adjustable to wrist any width, any angle.

The metal padded plates give an evenly distributed pressure upon the soft tissues. The holes along the slotted plates are for the attachment of the cords or extension mechanism. According as you attach the cords in a hole in the line of the leg or forward or backward, you can make a straight extension of the leg, an extension with flexion or extension of foot upon leg.

It is a matter of a few seconds to loosen the wing nuts and slip the mechanism off the foot in order to give the foot any needed attention.

This device can be used with a fracture box, a Thomas splint, pulley and weight, Balkan frame or, in short, with any of the usual methods of correction by extension of fracture deformities of the limb.

* Read before the Northern Medical Association, March 19, 1928.

DERMOID CYSTS
OF THE GREAT OMENTUM

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A REVIEW of isolated case reports and a review of the literature seem warranted when a condition is met with that is seldom encountered or brought to the attention of the physician. Dermoid cysts are found in nearly every organ of the body, but their occurrence in the omentum is rare if one judges from the number of reported cases found in the various textbooks and journals.

History. The first dermoid cyst of the omentum was described by Meckel[19] in 1815. Arekion[3] and Delnez[8] considered them in 1891 in a thesis on abdominal cysts. Lexer[17] later published a paper on tumors of the abdominal cavity and gave them some consideration. Chancenotte[6] in 1903 discussed the subject in a brief thesis. There have occurred isolated reports of the condition by various writers that will be given in tabulated form.

Etiology. They seem to be more frequently found in women than in men, for which no definite reason is given other than a hypothesis that congestion during menstruation and pregnancy may be responsible for their occurrence. Heredity may play a part and trauma to some extent may be a causative factor, although the number of cases reported are too small to afford any reliable data.

Warthin[27] believes that primary tumors of the omentum are rare and thinks they are secondary, having become detached from the ovary. Sajous[22] states that the dermoid springs from the ovary, becomes separated and is implanted on the omentum. Lexer and Bevan[18] believe that they are formed from pieces of ectoderm that become invaginated during the closure of the abdominal wall.

Embryology of the Omentum. The splanchnic mesoderm adjacent to the entoderm on each side comes in contact and fuses, forming a sheet of tissue called the common mesentery, which is attached to the dorsal body wall. It becomes known as the dorsal and ventral mesogastrium; the former fuses and forms the great omentum, according to Bailey and Miller.[4] After the third month it becomes larger and spreads over the transverse colon and intestines; at the fourth month it fuses with other structures and becomes less free. During the first or second year after birth the two lamellae fuse with each other and form the great omentum of the adult, according to Spitzka.[24]

Anatomy of the Omentum. William J. Mayo[21] describes the omentum as two folds of peritoneum passing downward from the greater curvature of the stomach, doubling back on the underside to the transverse colon, forming the omentum. Between the folds are large quantities of fat and blood vessels anastomosing freely with blood vessels to the peritoneum. Charles Mayo[20] observes that the omentum appears first in the lower vertebrates and is absent in fish and some birds. Crouse[7] believes the function is somewhat like the spleen, holding a large number of phagocytes, having great absorption through its cellular tissue, lymph channels and blood vessels.

Pathology. The pathology is the same as dermoids in any other region. It seems, however, there is less development of bone, cartilage, muscle fiber and blood vessels if derma is present. The size may vary from that of a pea to a large size tumor. In most instances the situation has been between

the two layers of the omentum. The walls of the tumor vary in thickness and may be formed of tissues having the appearance of skin, bone or cartilage. Teeth may be present in the structure.

Symptoms. Symptoms of any tumor of the omentum are rather vague; dermoid cysts are more difficult from the standpoint of symptomatology. They are more frequent in women and have a slow progressive course. Pain may occur early or may be absent. There may be a swelling which causes pain on pressure, the growth may or may not be fixed, ascites rarely occur. Rectal or vaginal examination may give some information if the tumor is low in the pelvis.

Diagnosis. There are no definite symptoms or signs by which dermoid cysts of the omentum may be diagnosed. The roentgenogram may help if the tumor contains bone or opaque material. There are other abdominal conditions that must be considered in the diagnosis such as:

1. Tumors of the liver.
2. Enlarged spleen.
3. Ovarian cysts.
4. Pancreatic cysts.
5. Renal tumors.
6. Lipomatoma.
7. Mesenteric cysts.
8. Aortic aneurism.

A large number of these conditions are found when the abdomen is opened for some other condition. This has been the usual occurrence in the diagnosis of dermoids of the omentum.

Prognosis. These tumors have a slow course and the prognosis depends on the complications that may arise. They may cause pulmonary conditions such as pleurisy or pneumonia due to compression. Intestinal obstruction may result from pressure or adhesions. Rupture may occur and cause peritonitis.

Treatment. The treatment is operative and should be carried out as soon as possible, for the longer they exist the more difficult the operation, due to adhesions with surrounding structures. Intestinal resection and anastomosis may be necessary. The omentum is resected in their removal. Sometimes they are encountered during hernia operations and should be removed.

CASE REPORTS

Abbe[2] removed from a woman a dermoid that was attached to the great omentum, after he had removed an ovarian cyst.

Bonfigli[5] found at autopsy a dermoid attached to the great omentum in a woman who had died of omental disease. The tumor weighed 470 grams, was 13 cm. long and 9 cm. wide; it was filled with short brown hair and contained 19 teeth, 18 molars and one canine.

Chancenotte[6] reported found at autopsy in a young man sixteen years old a tumor which contained hair, spine, intestines, two upper limbs, a lower limb with six deformed toes and an umbilical cord.

Issalene[12] reported a boy three years old, admitted with a tumor in the right inguinal region; on opening the sac he found two tumors which were dermoids attached and developing in the omentum.

Kuster[13] reported a case of a young girl eighteen years old who fell on her abdomen, causing severe pain for which she sought relief. A puncture of a fluctuating tumor below the symphysis was made. It was decided she had a hematoma, an operation was done and a dermoid cyst of the omentum was found.

Lipscher[14] performing an operation on a woman forty-five years of age for a movable spleen found a dermoid attached to the omentum.

Lebert[15] found a tumor containing hair and teeth in the omentum of a girl fifteen years old.

Ruysh[16] found in the omentum of a woman a tumor which contained fat and hairs. He thought this to be a dermoid cyst.

Taruffi[25] found in the omentum of a woman a dermoid cyst which contained hair and sebaceous material.

Griffiths[10] reported having removed a dermoid cyst from the omentum of a woman thirty-five years of age.

Ewing[9] mentioned in his textbook that

Ruysch and Martel had observed a large cyst in the omentum containing hair.

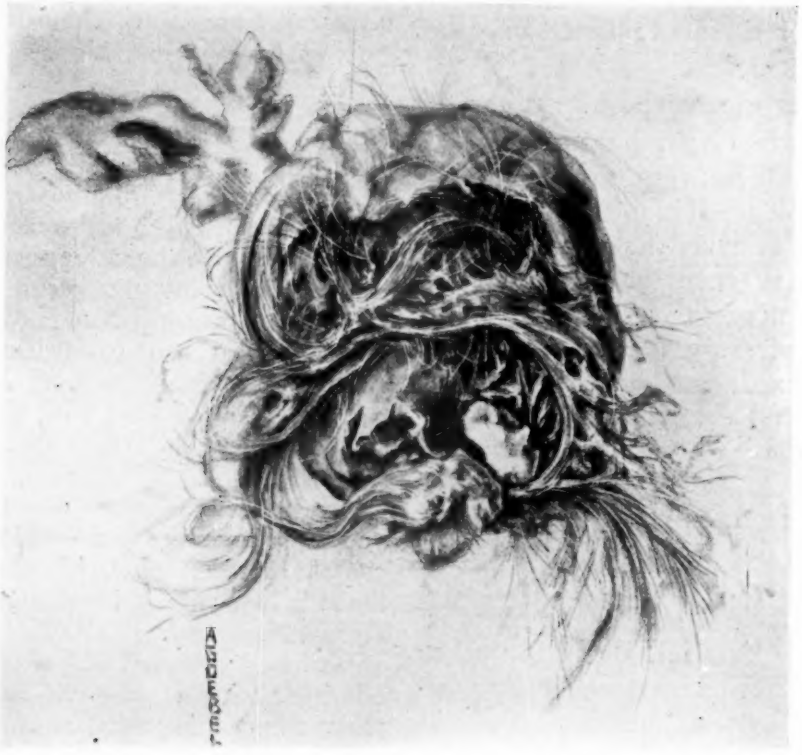

Fig. 1. Dermoid cyst, actual size, showing a portion of the omentum attached, with hair, fat, and one molar tooth.

Waldy[26] reported a case of dermoid cyst of the omentum in a girl eight years of age with a preoperative diagnosis of hydatid or dermoid

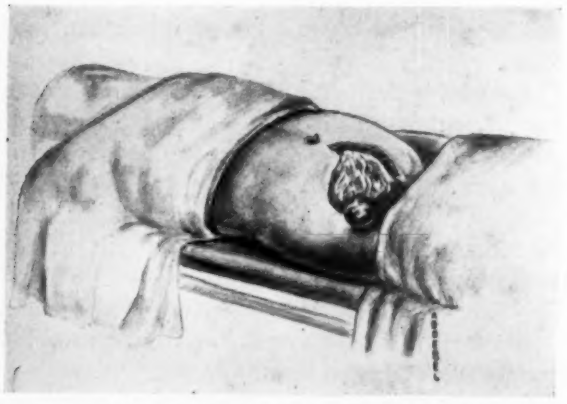

Fig. 2. Abdomen opened, omentum delivered showing dermoid attached.

cyst. There were three plates of bone in the wall and the sac contained pus. It was attached to the omentum.

Spencer T. Wells[28] reported a case in a female thirty-eight years of age with a tumor growing for eighteen years that was found to be a dermoid attached to the omentum with no pedicle.

Author's Case. S. Y., married, white, female, age thirty-five. Entered the hospital May 25, 1924, complaining of pain in the lower right quadrant of the abdomen, accompanied by backaches. The first trouble she noticed was three months before admittance, when she began having pain in the lower right abdomen accompanied by a fullness, which was continuous in character lasting for two or three days to reoccur in one or two weeks. There had never been any nausea or vomiting.

Menstruation started at the age of twelve, was regular every twenty-five to twenty-eight days, last period eleven days before admittance. Married twice, first at eighteen years, second two years ago; four children, no miscarriages.

Physical Examination. Well developed, well nourished, white, female, weight 115, not very ill. Skin and scalp negative, pupils equal and react to light. Ears, nose, mouth and throat negative. No goitre or enlarged glands about the neck. No heart murmurs or râles in lungs.

SUMMARY OF REPORTED CASES

Reported by	Age	Sex	Size	Preoperative diagnosis	Year
Abbe	Not given	Female	4" diameter	Ovarian cyst	1895
Bonfigli	50	Female	15 × 9 cm.	Autopsy	1875
Chancenotte	16	Male	Not given	Autopsy	1903
Griffiths	35	Female	4½ diam.	Not given	1891–92
Issalene	3	Male	2 cysts, size olive & pigeon's egg	Ing. hernia	1914
Kuster	18	Female	Not given	Hematoma	Not given
Lipacher	45	Female	Not given	Movable spleen	1903
Laflize	15	Female	Not given	Not given	1792
Lebert. idem Ruysh	Not given	.....	Size of fist	Not given	1734
Ruysh & Martel	Not given	Female	Large	Not given	Not given
Taruffi	Not given	Female	Not given	Not given	1886
Waldy	8	Female	Not given	Hydatid or dermoid	1889
Wells	38	Female	Not given	Not given	1882

The extremities negative. No masses or rigidity of abdomen, some tenderness above, the symphysis more marked on the right side. Pelvic examination showed a slightly eroded cervix, uterus slightly retroverted about the normal size. Mass in right broad ligament, high but not tender, left side negative. Bimanual examination by gynecologist, "vulva reddened, uterus anteflexed, moderately movable, left adenexa apparently normal, parametrium shortened and thickened. On the right side discoid mass size of an orange moderately movable and not trumpet shaped." Five days after admittance she was discharged from the hospital to be under observation of her family physician. (This history and record of examination was taken from the hospital records.)

I first saw the patient at her home September 1, 1926, and found her confined to her bed suffering from a severe pain of two weeks duration in the right lower abdomen. Pelvic examination at this time revealed a cystic mass high up on the right side which could be felt easily, due to thin relaxed abdominal wall. It was thought she had an ovarian cyst. Hospitalization was advised and three days later the abdomen was opened.

A mid line incision was made, abdomen opened and the omentum found in the pelvis. On delivering it there was found a hard mass about two inches in diameter, attached to the right portion. No other attachment could be found; both ovaries were negative. The tumor was opened and contained fat, hair and teeth. She had an uneventful recovery and was dismissed from the hospital thirteen days later.

Patbological Report by Dr. Paul Carson. An oval cystic mass 5.5 cm. in diameter. Walls are 2 to 3 cm. in thickness, except for one area of about 3 cm. in diameter where the wall is about 8 mm. in diameter. The cavity is filled with a yellowish white, greasy material which springs from the thickened area of the wall.

Under the miscroscope sections of the wall are seen to be composed of connective tissue with a lining of simple stratified epithelium. Sections through thickened area are more complex, showing papillae as in skin, with sebaceous glands and hair follicles. In tissues around areas of attachment no ovarian tissue is found.

The diagnosis was dermoid cyst of omental attachment.

SUMMARY

1. Dermoid cysts of the omentum are rare.
2. No description can be found in textbooks or journals.
3. Isolated case reports are all incomplete.
4. They are more frequently found in women.
5. Symptoms are vague, diagnosis difficult.

The author wishes to thank Miss Minnie Goehring, librarian, for her aid in reviewing the literature.

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THE PRESENT STATUS OF BURN THERAPY

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BURNS may occur from the effects of hot air, hot liquids or steam, from exposure to sunlight and to ultraviolet light, and from acids, alkalis, electricity, roentgen rays, radium, caustic substances of various kinds and irritant gases (Schamberg[1]).

In this country and Germany it is customary to classify burns into three grades according to the depth: first degree, erythema; second degree, vesicle formation, and third degree, partial or complete involvement of the skin or underlying structures. In England and France it is usual to divide burns into the six degrees of Dupuytren's classification, viz.: first degree, superficial congestion; second degree, bleb formation; third degree, destruction of cuticle with exposure of the nerve terminals —the most painful form of burn; fourth degree, the whole thickness of the skin is destroyed; fifth degree, the muscles are encroached upon, and sixth degree, the entire limb is involved.

According to Pack[2] and MacLeod[18] the extent of a burn is more important than the depth. All burns of first degree are fatal if two-thirds of the body surface is involved[3] and all burns of second degree are fatal in adults if one-third of the body surface is involved, and in children if one-seventh is involved.[42] All burns covering one-third of the body surface are extremely serious, if not imminently fatal. All burns involving one-tenth of the body surface should be considered serious (Pack).[2] Berkow's[4] work is useful in the estimation of the extent of surface lesions. He concludes that the lower extremities, including the buttocks, comprise 38 per cent of the body surface; the trunk, including the neck, 38 per cent; the upper extremities 18 per cent, and the head 6 per cent. The hand is one-quarter of an upper extremity and the arm three-quarters. Of the lower extremity, the foot is one-sixth, the leg one-third, and the thigh one-half.

It would seem highly desirable that in the future burns be classified both by extent and depth, for example, a 30 per cent second-degree burn, or a 10 per cent third-degree, or a 25 per cent second-degree burn. It is to be remembered that other things being equal, burns in children and infants are more serious than in adults. Forty-five per cent of the deaths from burns occur during the period from birth to the fifth year.[5]

More recent studies have added to our knowledge of the physiology of burns. In extensive burn cases the adrenal glands weigh from three to five times the normal and the epinephrin content is absent or low (Weiskotten).[6] Olbrycht[7] states that the only anatomic changes in severe burns in man and animals are in the adrenals and that the intensity of the hyperemia and ecchymosis and reduction or total loss of chromaffin substance and lipoid in these glands seemed to depend upon the extent of the burned area and the age of the subject, being most pronounced in the young. He says that the adrenals displayed the same type of changes as in anaphylactic shock and peptone intoxication and he ascribes these changes to a toxic action from the decomposition of protein in the burned tissues. Brancati[8] believes death to be due to an anaphylactic shock from the proteins changed by the heat. Robertson and Boyd[14] believe the toxin to consist of primary and secondary proteoses. The interesting work of Greenwald and Eliasberg[9] shows that in rabbits the cause of death may be divided into two stages: (a) initial stage which is due to shock and

which is accompanied by high blood sugar content due to a hyperactivity of the adrenals, and (b) the secondary stage which is due to degenerative changes, particularly in the adrenal. From this it would appear that the administration of adrenalin is to be restricted to the second stage and is contraindicated in the primary stage. Theoretically, the use of insulin might seem to be indicated in the primary stage.

Underhill, Garrington, Kapsinow, and Pack[10] studied the concentration of the blood in burned cases by means of hemoglobin estimations. They found that in extensive superficial burns the blood becomes highly concentrated, and they believe that the degree of blood concentration is an index of the patient's general condition. Davidson and Mathew[11] explain this concentration of the blood in burn cases by assuming an early increased permeability of the capillaries. Pack,[2] basing his belief on his work with Underhill,[10] feels that a 40 per cent increase in hemoglobin, if maintained over a period, is incompatible with life. The extreme concentration of the blood requires the copius administration of fluids by all avenues.

Davidson[12,13] showed a lowering of the whole blood and plasma chlorides which is proportionate to the amount of tissue devitalized and which is present as long as sloughs are present. On this account Davidson suggested sodium chloride administration.

According to Novak,[40] ulceration of the gastrointestinal tract is an uncommon complication of extensive cutaneous burns, occurring probably in about 5 per cent of the fatal cases. Ronchese,[41] in reporting a fatal hemorrhage from a duodenal ulcer fourteen days after a third-degree burn, says he has seen ulcer but once in 348 burned persons.

TREATMENT OF EXTENSIVE BURNS

Primary Shock. The primary shock in extensive burn is similar to any surgical shock. There is blunted sensibility, cold moist skin, subnormal rectal temperature, irregular sighing respirations, rapid "thready" pulse and very low blood pressure. Morphine is given in dosage adequate to control pain. External heat is applied and fluids are pushed using hypodemoclysis or proctoclysis if necessary. Great care is to be exercised in the removal of the clothing. It is very shocking and often may be better deferred until there is some recovery from shock. Placing the patient in a warm bath often facilitates the removal.

Toxic Shock. In twenty-four to forty-eight hours, or as late as the fourteenth day,[15] the signs of the toxic protein absorption become evident. The temperature is elevated, the pulse is rapid, the patient may be drowsy or delirious, there is vomiting, and death may quickly ensue. Long before this stage measures should have been instituted in the wound itself which tend to make the toxin innocuous or remove it altogether. Should, however, there be evidences of toxemia this is to be energetically combatted.

Systemic Treatment of Toxemia. (a) 4000 to 5000 c.c. of fluids, preferably sodium chloride solutions, are given by hypodermoclysis, protoclysis, and by infusion. Sodium bicarbonate and water are given by mouth. This alleviates the blood concentration and the low chloride content. Should fluid accumulate later in the tissues, magnesium sulphate will assist in its removal.

(b) Epinephrin may be indicated to remedy adrenal deficiency.

(c) Blood transfusions. Riehl[16] first advocated blood transfusions in 1925, and in 1927[17] he reported the use of blood transfusions combined with the "customary" other methods in thirty-two severely burned cases; ten cases, which most probably would have been fatal, recovered. In eleven cases the blood transfusions prolonged life, and in two cases they were of no value. Davidson[42] transfuses on admission any patient with a possible lethal burn. This is done before the onset of shock. If shock develops the

transfusion is repeated in less than twenty-four hours. In 1923, Robertson and Boyd[14,27] proposed the rather heroic exsanguination-transfusion in which the patient is thoroughly bled before the transfusion.

Local Treatment of Toxemia. In 1925, Davidson[19] made his epoch-making contribution to the therapy of burns. This worker, in searching for a chemical which would fix the toxic substances in the burned tissue, hit upon tannic acid. The burned area should, at the earliest moment, be covered with gauze saturated in a 2½ per cent freshly prepared aqueous solution of tannic acid. The gauze is kept moist with this solution or the skin is directly sprayed with it for twenty-four hours or more until the burned skin is thoroughly tanned. At this stage it is deep brown and dry. After this time the burn is treated in the open air by a cradle. Warm irrigations of boric or saline are useful to remove any discharge or loosened sloughs. The bed linen and drapes must be sterile. An electric light bulb is placed inside the cradle to insure warmth (about 100°F.) and dryness. Hosmer[36] believes a wire immobilizing cage to be useful in extremity burns. The tannic acid treatment has received hearty endorsement by Bancroft and Rogers,[20] by Beck and Powers,[21] and by Cabot.[22] On the face a 5 per cent tannic acid ointment is used. The availability of this method is evidenced by the paper of Shen[23] in the *China Medical Journal.* Shen found an infusion of tea to be nearly as effective as the tannic acid solution and gives the following directions for its preparation. One gm. of leaves in 100 c.c. of boiling water is considered as a 1 per cent infusion. The infusion, to be effective for protein precipitation, must be 8 per cent. A fifteen minute 8 per cent infusion is prepared and sterilized by boiling. This tea is dark red in color and bitter to taste.

Hypertonic solutions have been advised, on the theory of withdrawing the toxins into the dressing. Wilson[33] champions the "detoxication" treatment of burns by employing dressings which provoke osmosis toward the surface. He uses sodium chloride and glycerin and later saturated boric solution, changing the dressings frequently. This writer also employs a solution of standard ensol solution, one part; 10 per cent saline solution, two parts, and water, two parts. Robertson and Boyd[14] employ a saturated solution of soda bicarbonate. Ten per cent soda bicarbonate delivered by Carrell tubes is used by Goldblatt.[29] Waterhouse[28] uses aluminum acetate. Davidson,[12] however, warns against the use of wet dressings because of the danger of tissue rehydration.

Debridement of the entire burned tissue has been advised on the theory that toxic absorption cannot take place once its source is removed. Willis[24] believes that debridement relieves the toxemia, reduces the pain and hastens local healing. Pagenstecher[25] debrides the entire area and dresses the wound with an alcoholic solution of picric acid. Recently Mackenzie[26] also has recommended extensive debridement. Debridement is rather drastic, causes greater scarring, and since the advent of the tannic acid treatment is but rarely to be used.

The Treatment of the Wound. It is to be remembered that a burn is a wound and that the usual antiseptic and aseptic precautions which obtain in the treatment of all wounds apply to burns. All irrigations, applications, or dressings must be sterile. Strong antiseptics are to be avoided and irrigations with boric acid or merely normal saline solution are employed. Moorhead and Killian[15] make the somewhat startling statement that no antiseptic is of proven value in wounds and accordingly in burns. They believe antiseptics to be insufficient in infected wounds. Picric acid greatly lessens pain and while considered safe in a 1 per cent solution, it must be used with caution because of the danger of poisoning. An ointment containing butyn and picric acid is very soothing but the writer has seen dermatitis follow its use. Blisters are to be opened and drained at the side, preferably through the intact

skin margin, after suitable surface sterilization. The epidermis of the blister is not to be cut away unless there is pus under it.

The administration of tetanus antitoxin may be considered after first ascertaining the patient's nonsusceptibility to horse-serum. Goldblatt[29] reported three cases of tetanus among eighty-three cases of burns. Davidson,[42] however, believes that many recorded cases of tetanus have been convulsions due to edema of the brain or thrombosis.

Numerous applications have been devised whose primary purpose is to allay pain. Carron oil (equal parts of lime water and linseed oil) is a very efficient thing for relief of pain but is generally stale and contaminated. Tomb[34] uses a liniment made from a solution of chlorinated lime. Ambrine is a French preparation of secret formula but consisting essentially of paraffin and oil of amber. It has enjoyed considerable popularity in burn therapy. Sherman[30] treated 3000 cases by the paraffin method up to 1918 and still (1928) believes it very efficient.[43] The patient is free from pain after the first twenty-four hours in most cases. There is more rapid epithelization in surface burns under paraffin, and the scar formation is thought to be less.[31] Trueblood[32] emphasizes that paraffin should never be used in a wound harboring necrotic tissue. The wound should first be debrided and sterilized and also, according to Sherman, dried. The paraffin is then applied by spray or brush. The burn is dressed every day. Unguents containing phenol have use in allaying pain. Recently, Fist[35] recommended a combination of gelatin and formaldehyde which forms a rubber-like substance on burns. When the wound is cleanly granulating, adhesive, vaseline gauze strips or rubber tissue strips across the granulations will facilitate epithelization. Moist boric dressings may be used in conjunction with the strips. Koch[44] believes pressure, particularly that obtained by marine sponges, to be useful. Rubber tissue is to be kept between ringers to prevent adhesions and consequent "webbing." To large areas, particularly where contractures are to be feared as in the antetrachial, axillary and popliteal spaces, Thiersch grafts are to be applied with the extremity extended and splinted. The value of extension as a prophylactic measure against contracture is questioned by Blair.[45] Moorhead and Killian apply to the wound what they term "wound fertilizer." This is a mixture of one dram of scarlet red ointment to one ounce of sterile olive oil.

The correction of burn scars is a matter of plastic surgery. Of interest in this correction are the papers of Blair[37] and McCurdy.[38] Johnson[39] has found carcinoma in the scar tissue following burns. In lime burns of the eye, the gross particles should be removed by manipulation and douche. Olive oil may then be instilled. For the resulting corneal opacity, cocanize the eye and wash with a freshly prepared 10 per cent solution of neutral ammonium tartrate.

SUMMARY

Extensive burns (that is, of 10 per cent or more of the body surface) are first treated for shock by morphine, external heat, vigorous administration of fluids, and possibly by blood transfusion. As early as possible, gauze saturated with 2½ per cent tannic acid solution is applied to the entire burned area and kept moist with this solution for twenty-four hours or more until the burned skin is thoroughly tanned. The burned area is then treated by the open air method under a heated cradle, supplemented by warm boric or soda irrigations. Fluids are pushed, and epinephrin and sodium chloride may be exhibited. Repeated blood transfusions occasionally are indicated. When all sloughs have disappeared and the wound is cleanly granulating, adhesive or rubber tissue strips are applied and scarlet red preparations may be used to accelerate epithelization. Skin grafting occasionally is advisable.

For small burns (5 per cent of the body surface or less) the application of soothing ointments containing phenol or picric acids and gauze dressings is the best treatment.

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PRIMARY BRACHIAL PALSY

FOLLOWING DISLOCATION OF THE SHOULDER

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THE treatment of luxations of the shoulder has acquired the reputation of being such a commonplace and innocuous procedure that there is hardly a physician with the merest rudiments of surgical training who does not approach it almost light-heartedly. That this attitude is not entirely warranted is shown by the fact that practically every textbook which discusses the subject warns of the possibility of damage to the brachial plexus. That violent efforts at reduction, either by the Kocher method or by the now discarded procedure of putting the heel in the axilla, might lead to such disastrous results is readily comprehensible. It is probably not so keenly realized that simple dislocations completely untreated or treated lege artis by trained surgeons may also terminate in paralysis. Although it is doubtless true that many more cases have been observed, especially by the neurologists, than have appeared in the literature, the number certainly is small. Indeed, there are many surgeons, even those of wide experience, who have never once encountered a brachial paralysis either following attempts at reduction or occurring simultaneously with the dislocation and before the institution of any treatment. Of this latter type of primary palsies, somewhat less than fifty cases have been recorded. The presentation of the following cases may therefore be justified if they serve, once again, to direct attention to the rather serious complications which may be consequent upon the so-called benign condition of dislocation of the shoulder.

CASE REPORTS

CASE 1. B. M., housewife, aged sixty-two, was referred to me on October 11, 1927, with a history of having dislocated her shoulder one-half hour earlier. While walking over the subway gratings, her toe caught and she was thrown, striking upon her outstretched and abducted left arm. Immediately upon arising she complained of a pain in the left shoulder and observed that the whole arm was paralyzed and hung lifeless at her side.

At the time of examination no especial attention was paid to this observation because it was felt that the somewhat neurotic patient was overacting to the stimulus of her injury. Clinically and by roentgen-ray photograph, the patient presented the signs of a subcoracoid dislocation of the head of the humerus. The plate showed also some irregularity at the lower margin of the glusoid fossa (Fig. 1). Under ethyl chloride anesthesia, and with the utmost gentleness, the dislocation was reduced and supported by a Velpeau dressing. Because of the relatively minimal duration of the anesthesia and the flaccidity of the shoulder muscles, the ease with which reduction was accomplished was noted with suspicion. In view of the patient's nervous state, no attempt was made to ascertain the exact condition of the neuromuscular apparatus at this time.

However, when the dressing was removed at the end of forty-eight hours, it was found that the patient had very correctly directed attention to what proved to be an almost complete paralysis of the upper extremity. There was a moderate degree of voluntary flexion and extension as well as slight abduction and external rotation at the shoulder. Below the shoulder there was a complete paralysis of the muscles of the arm, the forearm and the hand. The patient complained of a feeling of increased heat and a tingling of the first three fingers which later involved the other two fingers. Apart from these signs of nerve irritation there were no evidences of sensory disturbance. The patient retained the deep muscle sense and responded promptly to both epicritic and protopathic stimuli. There was no Horner's syndrome and the patient was able to elevate the shoulder girdle.

In view of this extensive paralysis, in which the external rotators of the arm were spared, it appeared justifiable to consider the lesion as being located in the plexus at a point distal to the origin of the spinati muscles, i.e., in the trunks at the lower part of the brachial plexus. Because of the absence of any anesthesia and the presence of signs of nerve irritation, it seemed reasonable to diagnose not a complete rupture, but rather a contusion or stretching of the nerve fibres. The dressing was reapplied and kept on another week. It was then removed and gentle galvanic stimulation and graded muscle exercises were undertaken. Fearing to abduct the shoulder to the degree indicated by the nerve injury, the elbow was supported in a stout sling and the wrist was maintained in moderate dorsiflexion by means of a cock-up splint.

Within several weeks, the paresthesias had largely disappeared, though the patient continued to complain of spontaneous pains in the wrist, the elbow and the shoulder. At the end of about four weeks, although the vasomotor instability persisted, the patient had recovered at least partial power in the flexors and extensors of the elbow as well as in the wrist. There was evidence of slight return of the power of flexion, extension and opposition in the thumb. The galvanic response which had previously been practically nil became somewhat more lively. Dr. Rosenheck, who saw the patient in consultation shortly after this time, determined the presence of an inverted polar response to galvanism and the absence of any response to the faradic current, and gave a guarded prognosis. Under baking and massage, galvanism and muscle reeducation, the patient continued to make gradual improvement so that by the end of December, some ten weeks after the injury, there was a moderate degree of voluntary control of all the muscles of the extremity except the intrinsic muscles of the hand. The patient could oppose the thumb to the index, middle and ring fingers but not to the little finger. She could partially flex and extend the individual joints of all the fingers but could not make a fist. The power of abducting and adducting the fingers was still absent. The interossei and lumbricals, as well as the hypothenar muscles gave a definite though sluggish response to the galvanic current. Though the hand was still somewhat wooden, there was every evidence of gradually increasing function. About this time, dissatisfied with the rate of recovery, the patient disappeared from observation. Unfortunately, it is therefore impossible to report upon the exact amount of residual paralysis.

For details of the second case, I am indebted to the courtesy of my colleague, Dr. Jahss.

Case II. J. K., an automobile tester, aged twenty-seven, was referred to Dr. Jahss on July 27, 1922, with a history of having suffered a fissure fracture of the greater tuberosity and a dislocation of the right shoulder during an automobile accident on May 26, 1922. Immediately after the accident there was apparently complete flaccid paralysis of the upper extremity. The patient was taken to a Brooklyn hospital where the dislocation was reduced and the arm put in a sling for several weeks. During the time since the accident, the patient complained of being "unable to use the whole right upper extremity." At the end of two months of the usual treatment of baking and massage, there was still no improvement in the nerve condition and the patient was referred for consultation and treatment. Dr. Jahss found a complete paralysis of the right upper extremity. There was definite wrist drop and a slight tendency toward a pronation

Fig. 1. Subcoracoid dislocation with head directly beneath the probable course of the brachial nerves.

contracture of the forearm. There were no sensory disturbances nor any paresthesias. The muscles did not even react to the galvanic current. Dr. Rosenheck, who saw the case, diagnosed an injury to the brachial plexus and advised non-operative measures, giving a good prognosis for return of function. The arm was consequently supported in an aeroplane splint with the shoulder in abduction and external rotation, the elbow flexed to a right angle, the forearm supinated, the wrist dorsiflexed and the fingers extended. Baking and massage and graded muscle exercises were begun. As soon as the patient showed any response to galvanic stimulation, the galvanic sinusoidal current was employed. At the end of seven months there was a complete functional recovery of all the muscles with normal power.

The cases here recorded present a number of noteworthy features. The immediate onset of almost complete palsy, the total disproportion between the degree of the motor disability and the relatively insignificant amount of sensory disturbance and the prognostic value of the R.D. in the face of the rapid return of at least partial function are of the utmost interest and can perhaps best be appreciated by a review of the present state of our knowledge on this subject.

This type of brachial palsy occurs most frequently after subcoracoid or subglenoid dislocations. It may develop simultaneously with this injury, later following efforts at reduction or late in the course of affection as a result of a sclerosing perineuritis. Excluding this last type of cases, which later will be discussed briefly, the paralyses associated with dislocation of the shoulder have usually been considered as due either to injury to the brachial plexus or to the spinal roots entering into the formation of the plexus. Until the work of Duval and Guillain[5] most writers on the subject attributed the neurological signs to direct compression of the plexus by the dislocated head of the humerus. These latter authors, however, pointed out that at the point where the luxated head might possibly be expected to impinge on it, the plexus as such no longer existed. On the basis of their autopsy experience and cadaver experiments, they expressed the belief that in most cases the injury was located in the spinal roots and consisted of a total or partial avulsion of their fibres. In a small percentage of the cases, injury was observed to have occurred in the plexus. The resulting palsies were divided into two main groups, a primary, which developed immediately at or after the injury, and a secondary, considered by far the more frequent, which developed after attempts at reduction. Delbet and Cauchoix[4] studied the subject at a later date and came to somewhat different conclusions. As a result of their studies and a review of the literature, they divided these paralyses into two main categories: a primary paralysis which came on coincidentally with the dislocation or after efforts at its therapy, and a secondary paralysis which developed gradually as a late complication and was not directly due to the dislocation. In the primary type of paralysis, injury to the nerve was theoretically possible at three different sites. On this basis they again made three subgroups, the first characterized by injury to the spinal roots, the second by injury to the plexus, and the third by injury to the terminal nerves and nerve trunks into which the plexus differentiated. Palsies of the first group were far less usual than the work of Duval had suggested and were caused not by the dislocation itself but by a concomitantly acting cause, such as excessive traction on the roots. Paralyses of the second group, occurring from traumata to the main mass of the plexus, were practically non-existent, while by far the most numerous cases were those in which the dislocated head caused injury either to the lower part of the plexus or to the nerves in the axilla. In this sub-group they demonstrated experimentally on the cadaver that dislocation of the head of the humerus resulted in stretching of the lower part of the brachial plexus and its nerve terminations. Although all of the nerves suffered in a variable degree from

this overstretching, the median, ulnar and musculocutaneous nerves slipped over and behind the cartilagenous head to resume their normal positions as the humerus was forced farther and farther out. The circumflex and musculospiral nerve being more firmly fixed could not so easily escape. This accounted for the fact that they suffered the greatest damage and were by far the most frequently injured.

The nerve injuries to which dislocation may give rise may thus be attributed to two essential mechanisms, traction and pulsion. The former mechanism is brought into operation when the arm is widely abducted or when the distance from the head to the shoulder is increased as by depression of the shoulder or contrariwise by adduction of the head to the non-affected side. Among these may be classed the radicular palsies seen in dislocations, Erb's paralysis, and the type of uniradicular paralysis which I discussed in a paper several years ago.[3] In these the force may be said to act at a distance and usually, though not always, results in a high nerve lesion. In the paralyses produced by pulsion, on the other hand, the effect is more locally evidenced and usually produces a low nerve lesion. To this group belong the compression paralyses associated with fracture of the clavicle, neoplastic growths, aneurysms of the brachial vessels, as well as the palsies more commonly seen following dislocation of the shoulder.

In discussing traumatic paralysis of the arm, Thomas[12] reported a case in which the effect of compression of the musculospiral nerve by a posterior dislocation of the head of the humerus was shown as if in a laboratory experiment. The patient, a boy of seven, had suffered from and been treated for a right brachial palsy existing since birth. At the time of examination there was found a musculospinal paralysis and a posterior dislocation of the head of the humerus. At operation an attempt was made to replace the head in the abnormally shaped glenoid cavity. Within several weeks "there was evident a marked improvement in the muscles supplied by the musculospiral nerve as shown by the disappearance of the wrist drop." In the rest of the case report the impression is conveyed by implication that with the gradual tendency toward recurrence of the dislocation there was renewed evidence of muscular weakness. This mechanism of paralysis by compression must, however, be very unusual or otherwise it would be expected that following reduction the paralytic symptoms would disappear much sooner than has been true in the cases thus far observed. For the most part, it appears that compression must be abandoned in favor of the mechanism of stretching as an explanation of the majority of these cases.

The pathological pictures found in the nerves of patient paralysed in this manner have been very variable. In the high type of lesion spinal roots have been torn away from the spinal cord within the medullary canal while in other cases the avulsion has occurred outside of the spinal canal. Most frequently, the fifth and sixth cervical and to a lesser extent, the first thoracic roots have been noted in this connection. The presence of the apophysis of the cervical vertrabrae over which the root emerges has been considered by some authors as a factor in determining the location of the nerve injury. The rupture may be complete or incomplete and may be found almost anywhere along the course of the nerve root.

In the low type of lesion, involving the nerves in the axilla, complete rupture almost never occurs except in the case of the circumflex nerve. Incomplete tearing is more frequently seen, while the most common injury consists in a partial stretching or contusion of the nerves. Anger[1] has reported a case autopsied seven days after injury in which he found a hemorrhagic infiltration of the circumflex nerve for a distance of about 2 cm. Bardenheuer[2] reported intraneurilemmatic hemorrhages, while Weir Mitchell[8] found experimentally

that contusions of the nerve led to intraneural capillary hemorrhages and partial rupture of the axis cylinders and the myelin sheaths.

In the type of paralysis previously referred to as the secondary or late perineuritic type, the primary site of the injury is not in the nerves but in the connective tissues surrounding the nerves. These cases are characterized by the fact that following the reduction muscles apparently normal after the dislocation manifest progressively increasing signs of paralysis. Thomas expressed the opinion that in many cases such paralyses were due to extensive injury to the capsule and to the subsequent appearance of an exudate in the axilla. The paralyses in such cases could be attributed partly to an atrophy of disuse and partly to a sclerosing, post-traumatic perineural fibrosis which led to the strangulation of the nerves. Nicaisse[9] and others were able to demonstrate at autopsy and at operation a marked increase in the connective tissue of the axilla and more particularly about the brachial nerves coursing through the axillary space.

Apart from the paralysis, one of the most interesting of the clinical features of these post-dislocation palsies is the relative integrity of the sensory apparatus. Paresthesias and spontaneous pains in the muscles or the joints in this condition seem to be fairly characteristic of the incomplete lesions of mixed peripheral nerves, but the perception and the transmission of various sensory stimuli seem to be singularly little affected. Oppenheim[10] remarks that "sensory disturbances are usually present but are of very variable extent. I have seen cases of total paralysis of the arm nerves where anesthesias of the hand or of the hand and forearm were only indefinitely developed." Duval was of the opinion that this was largely due to the inadequate observation of the cases heretofore reported. Such an accusation, however, hardly seems justifiable if the calibre of the men who recorded these cases be given any weight. Nevertheless, with this objection in view, careful and repeated attempts were made in Case 1 reported above to determine the degree of any impairment of sensation. It may be stated without equivocation that except for a few transitory parethesies both deep and superficial sensation remained normal from the very outset. In view of the frequently extensive motor lesions, it must be considered noteworthy that in involvement of mixed nerves there should be such an unexpectedly small degree of sensory loss. Several different theories have been advanced to account for this interesting phenomenon. Delbet observed that in order to get well developed sensory disturbance it was necessary to predicate the total sectioning of the sensory fibres of at least three roots. Lüderitz[7] showed by experiment that continuously increasing tension caused an interruption in the conductivity first of motor nerves and only later of the sensory nerves. Others have insisted upon the presence of what might be called a collateral nerve supply to account for the absence of sensory symptoms. Whatever be the explanation, the fact remains that through some not entirely certain mechanism, the motor paralysis of both voluntary and smooth muscle, vasomotor and secretomotor, dominates the clinical picture.

Lacking any definite distribution of sensory disturbance, efforts have been made, especially by French students, to establish a lesion level by the careful determination of motor loss. Grenet[6] presented a differential scheme which, on theoretical grounds, should lead to the determination of the site of the injury with almost mathematical exactitude. Thus beginning peripherally, lesions of either of the peripheral nerves would lead to demonstrable paralysis in the region supplied by these separate nerves. Lesions of the cords would lead to paralysis in the area supplied by the several nerves which were derived from the cord affected. Injuries more centrally situated in the trunks would

result in palsy of the Erb type in the case of the upper trunk and of the Klumpke-Dejerine type in the case of the lower trunk. The levator anguli scapulae, the rhomboids, the serratus magnus, and the spinati would retain their integrity. In radicular, extraspinal injuries, the supraspinatus and infraspinatus muscles would be paralysed. Radicular, intraspinal injuries situated in the upper roots would lead to a paralysis of the serratus magnus, the rhomboids and the levator anguli scapula, while lower root traumata would lead to the presence of Horner's syndrome.

This differential system is interesting from an academic point of view but appears unnecessarily complicated for the clinician's needs. Moreover, it frequently happens that the lesion is sufficiently extensive to involve not only roots but also parts of the plexus and thus give rise to a confused symptomatology. Oppenheim, in discussing this point, observes that "a sharp division between the root and plexus cannot be drawn." Other authors have shown that for the purposes of therapy, it is merely important to determine whether the injury is of the high or low types. In the high type operative intervention is impossible, while in the selected low types case, of which Erb's may serve as an example, surgery may be of avail.

Before going on to a brief discussion of the therapy of this condition, it may be interesting to consider certain facts of prognostic significance. In general it may be said that, regardless of the form of therapy, those cases which present evidences of paralysis of the whole arm should be given a rather unfavorable opinion as far as complete restoration of power is concerned. On the other hand, the outlook is not always as black as it may at first sight appear. Stewart and Bristow[11] note that "it is particularly characteristic of brachial plexus injuries that in many cases a lesion which at first appears to be complete gradually shows signs of partial recovery, with the result that the ultimate area of total paralysis may be confined to the upper or lower portion of the plexus."

In this connection the significance of the reaction of degeneration in the affected muscles may very well be considered. The impression seems to be generally prevalent that a reaction of degeneration is in itself a sign of the utmost gravity. Although it must doubtless be given weight, it must not, on the other hand, be thought of as conclusive. In the first place the R.D. may be of variable degree. There may be at one extreme merely a loss of nerve response to faradic stimulation or at the other extreme a loss of nerve and muscle response to both the faradic and the galvanic currents. In the latter case, of course, the prognostic import of the complete R.D. is much more serious than in the former case of partial R.D. In the second place, the R.D. does not always go pari passu with the paralysis, as Oppenheim has demonstrated. On the one hand there may be a return of electrical conductivity in the presence of complete paralysis. This has been explained by some as due to a loss of continuity of the axis cylinders while the myelin sheaths remained intact. On the other hand, as in the cases here reported, the R.D. may persist in the face of definite and even rapid improvement in the contractile power of the involved muscles. By some this has been explained as due to a regeneration of the axial fibres, by others it is thought due to a degeneration of the superficial with retention of the axial fibres. Cases have been reported where after the lapse of one or even two years there has been gradual increase in function and ultimate return to normal of the electrical reactions. All that can confidently be said of the reaction of degeneration is that it definitely indicates, if anything, an extended period of recovery. More than this it may be said that to the degree in which it is complete and in which it tends to persist, the R.D. may be looked upon as suggesting an unfavorable outcome.

As in the case of Erb's palsy, the treatment may be either operative or conserva-

tive. There are those who insist upon early operation. Delbet and Cauchoix are at one with Bardenheuer in insisting upon operation, if at the end of two weeks there be no indication of return of function. On the other hand the results which these authors adduce from the literature are far from encouraging to subsequent surgical endeavors. It is noticeable that in the upper roots, where complete rupture is most apt to occur, the operative results are poorest. In the trunks and in the brachial nerves where contusions are most frequently seen, the results are admittedly better. In the cases of delayed appearance of the paralysis in which, with reasonable certainty, the paralysis can be attributed to a sclerosing perineuritis, most authors are agreed on the value of surgical neurolysis. Duval, firm in the conviction that the lesion consisted in an avulsion of the roots, advised against operative interference. Oppenheim, quoting two cases recorded by Tillmanns and by Cervera in which operation after ten to fourteen years resulted in regeneration, cautioned against too hasty surgery and advised palliative treatment and, above all, rest. This must consist of the orthopedic and physiotherapeutic measures usual in the handling of paralyses of the arm: abduction splint, baking and massage, muscle reeducation and electrical stimulation. Both faradic and galvanic currents have been used for this purpose, depending upon the type of electrical response present in the affected muscles. Lapicque, in studying the chronaxie of nerves, showed that the normal duration of stimulation of the ordinary faradic coil for about $\frac{1}{1000}$ of a second is about equal to the minimal period of response of the normal nerve to this current. The chronaxie of the muscle, deprived of its nerve supply, is about $\frac{1}{100}$ to $\frac{1}{50}$ of a second. The therapeutic inference to be drawn from these facts is obvious. Where no R.D. has been demonstrated, faradic stimulation is warranted. Where an incomplete R.D. has developed and either the nerve or the muscle still responds to the galvanic stimulus, this current is indicated. Where the R.D. is complete and for as long as it remains complete, the use of electricity will be without avail.

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CASE REPORTS

CASE REPORTS BY DR. MATHER CLEVELAND

NEW YORK

GIANT CELL TUMOR OF THE TIBIA*

A. S., aged fourteen and a half years, New York Orthopaedic Hospital No. 74030, May, 1924.

Patient injured his right ankle one year ago and shortly afterward it was operated at Bronx Hospital. For past ten months he has been unable to walk on it. The right ankle was swollen and tender without heat. A healed scar over the medial malleolus; the skin was thin and discolored and it looked as if there was an abscess. The leg was 2½ inches smaller than left and atrophy of left thigh also marked. The Wassermann was negative. Red blood cells, 4,000,000; white blood cells, 6,600; hemoglobin 80 per cent; polymorphonuclear leucocytes, 53; lymphocytes 47 per cent.

Roentgenogram: Epiphysis and metaphysis of right tibia distally and posteriorly show marked expansion of the cortex over a cystic area showing marked trabeculation consistent with giant cell tumor. The history of previous incision and drainage and the appearance of an abscess, without heat to be sure, made us fee that the condition must be an osteomyelitis. A careful study of the roentgenogram would have set this right.

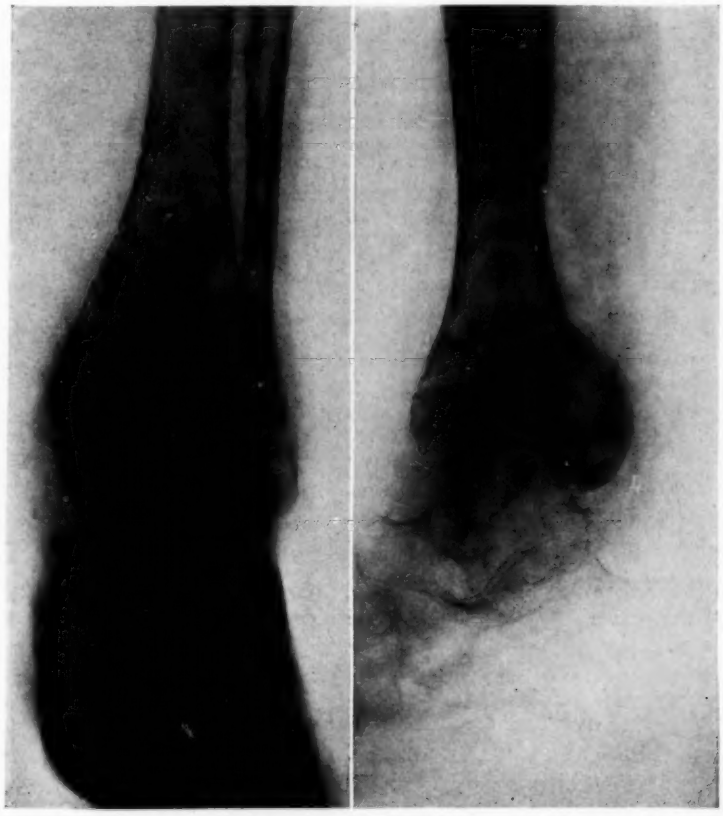

FIG. 1. May 21, 1924. Lower end of tibia invaded by neoplasm.

Operation: May 27, 1924. The entire lower end of the tibia was found to consist of a mass of currant jelly material. This was curetted away as cleanly as possible leaving a cavity about 4 cm. in diameter. The articular cartilage

* Read before Section of Orthopedic Surgery, New York Academy of Medicine, December 16, 1927.

FIG. 2. June 5, 1924. Immediate postoperative picture with bone chips in situ.

FIG. 3. August 5, 1924. Bone chips beginning to lose their identity with considerable growth of new bone.

remained as part of the shell over the cavity but this was buttonholed. This cavity was packed with bone chips from the opposite tibia and the soft tissues were sutured over it.

Pathological report showed a typical giant cell tumor and the case is registered with the Bone Sarcoma Registry.

The patient remained in the hospital about one month after the operation and was discharged with a plaster of splint on the leg. Postoperative course was uneventful. Three months after operation there seemed to be perfectly firm solid bone formed and he began to bear weight.

The case is shown as a three and a half year result and also to let you see the part played by the bone chips in the growth and repair of the bone. He now walks normally, is an athlete, runs the 100 yard dash in eleven seconds.

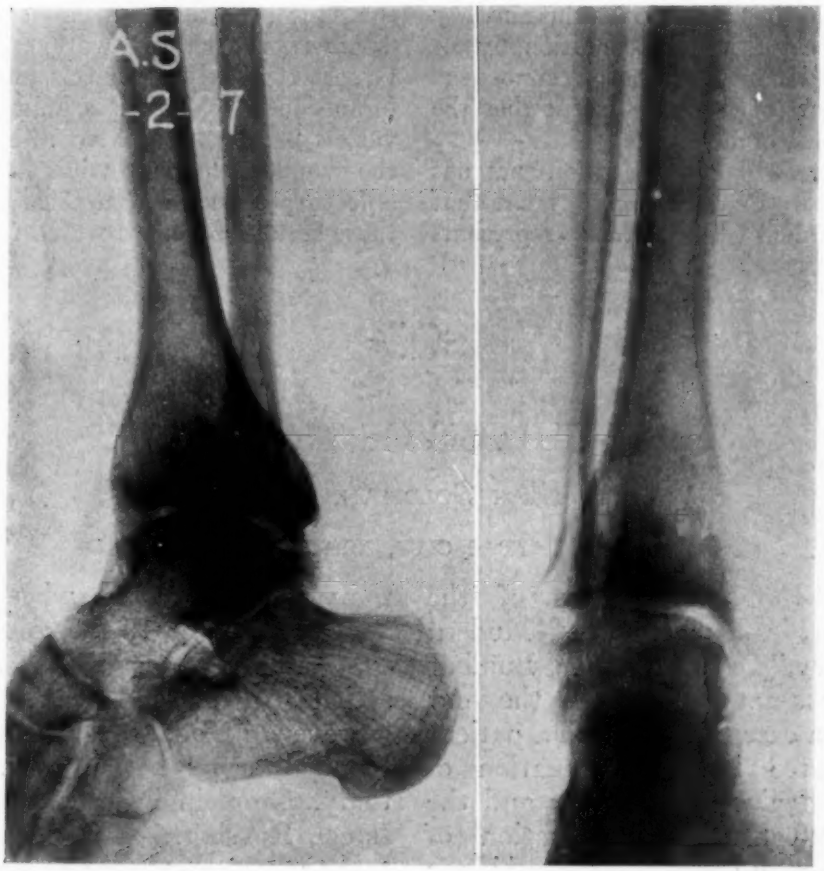

Fig. 4. September 2, 1927. Thirty-nine months after operation; almost complete restitution of lower end of tibia and no evidence of neoplasm.

DYSCHONDROPLASIA*

F H., aged nine years; New York Orthopaedic Dispensary and Hospital, No. 39872. This boy came to the New York Orthopaedic Dispensary in 1920 at the age of two years with a left leg which was 2 inches short and bowed. He next appeared three and a half years later when he turned up because the left leg was now 6½ inches shorter than the right and he could not walk. An extension brace was made for him.

There was now very marked posterolateral bowing of the tibia and some bowing of the femur. The metaphyses of the long bones of the left leg were quite markedly enlarged and deformed. He was admitted to the Hospital and given a course of antiluetic treatment even though his Wassermann was doubtful and his father's and mother's were negative.

A year later, in 1925, an osteotomy of the tibia was done. The leg was still 6 to 6½ inches shorter than the right. In January, 1927, tissue was removed from the metaphysis of the tibia for study. It was found to consist of cartilage showing cystic degeneration. At the present time the patient shows a normal physical examination except for his left leg which is 7 inches shorter than the right.

The condition is a chondrodysplasia of the type known as Ollier's disease, which is described as an irregularity in the growth and development of cartilage localized in the metaphyses of the long bones of one side of the body with resulting skeletal deformity.

It was first described by Ollier in 1899. These cartilaginous masses undergo spontaneous healing by delayed ossification. Up to 1924 there

* Read before Section of Orthopedic Surgery, New York Academy of Medicine, December 16, 1927.

have been reported 15 cases beside this one. My attention was called to the condition by an article by Cole[1] in 1926. His case is almost the exact counterpart of this case except that the right leg only was involved.

The most interesting investigation that has been carried on by Bentzon who considers that the condition called Ollier's disease represents the typical reaction of the bones against certain disorders in the innervation of their blood vessels. It may be assumed to be related to the formation of callus in a fracture, the blood vessels having been interrupted. By dividing the sympathetic nerve trunk in rabbits he was able to produce structural changes similar to those seen in Ollier's disease in two cases.

TUBERCULOSIS OF THE KIDNEY*

Max Goldman, M.D.

Kansas City, Missouri

DISCUSSING tuberculosis of the kidney in his treatise, "Modern Surgery," DaCosta[12] says: "Lumbar nephrectomy is not justifiable in the very beginning of a case because such a patient might be cured by a combination of medical and hygienic treatment; and the weakening effect of the operation of nephrectomy may cause the other kidney to develop tuberculosis rapidly . . . If the kidney is markedly enlarged, if there is profuse hematuria, if the fever is high and persistent, if only one kidney is involved, if the other kidney has a satisfactory functional capacity, and if the bladder and prostate are free from disease, perform nephrectomy."

As contrasted with this conservatism, the case about to be reported tends rather to demonstrate that the indication for treatment is early radical removal of the infected organ. With facilities now available for earlier and more accurate diagnosis in renal tuberculosis, it has been shown many times that cases in which the disease is still limited to one kidney are almost always cured.

In Ziemssen's Cyclopedia, 1877, Epstein said that all treatment is apparently hopeless. In 1885 Gross advised nephrectomy for tuberculosis whenever possible. Willy Meyer in 1896 expressed opinions that are accepted today as the most satisfactory methods of treatment. Senn, however, insisted on proving the other kidney normal before advising nephrectomy. Kronlein in 1904, Bevan in 1907, Israel, Rovsing, Kelly, Von Bergman, the Mayos, and numerous others have established decided views upon the indications for radical interference when the diagnosis of tuberculosis is made, nephrectomy being the generally accepted procedure unless definitely contraindicated by the patient's general condition, or the advanced involvement of the opposite kidney.

The therapeutic application of sunlight and the use of special hygienic measures, in sanatoriums particularly where the treatments can be conducted scientifically, carefully supervised and carried out along much the same lines as that for tuberculosis in other organs as the lungs, bones or joints has been found very effective in cases of bilateral renal involvement and in urogenital tuberculosis. The local lesions assume a tendency to heal and the patient's general condition improves through the development of an increased immunity against the infection. Numerous clinical cures of vesical and genital tuberculosis have been reported.

[1] Cole, W. H. Chondrodysplasia. *Surg. Gynec. & Obst.*, 42: 359, 1926.

*Read before Staff of The Alfred Benjamin Dispensary, December 2, 1926.

Out of 128 cases observed by W. H. Shutz,[11] 35 were classified as clinical cures or at least arrested cases. The achievements of W. F. Martin with physiotherapy in renal tuberculosis are admirable, and the encouraging reports on the use of tuberculin as recommended by Penzholdt, and of heliotherapy as advocated by Rollier have stimulated clinicians everywhere to apply these measures in their efforts to effect a cure for genitourinary tuberculosis.

However, it is in regard to the surgical treatment of unilateral renal tuberculosis that urologists join in a unanimous opinion. Although they may feel that nephrectomy is probably not the ideal treatment, they nearly all agree that it affords the best measures of relief in most cases, the exceptions being those in which operation is definitely contraindicated, and that it does bring about a complete cure in a very large percentage of cases that come to operation early.

This phase of the subject was clearly and ably presented recently by J. J. Stutzin[6] of Berlin in which he refers to the gravity of an interference so radical as the removal of a kidney, expressing the hope that sooner or later a more conservative method of treatment will be presented as a substitute, but concludes, nevertheless, after reviewing every variety of therapy in vogue, that at the present time, at least in the earlier cases, it is the best method.

Again, there are numerous authorities who insist that unless the diseased kidney be removed by early operation renal tuberculosis will lead inevitably to a fatal issue, that no evidence of an actual cure has been found even after a most careful review of extensive pathological material. Joly believes firmly in early nephrectomy and states that if a diagnosis were made within one year of the first symptoms, "the operative mortality would be negligible, the later mortality not more than 10 per cent, and cures would be brought about ultimately in 75 per cent." Wildboltz and Israel both have asserted that there is no non-operative cure for renal tuberculosis.

The successful treatment of renal tuberculosis, whether it be operative or non-operative, depends largely upon its early recognition, hence one can not fail to acknowledge the importance of a timely diagnosis. Braasch says that the diagnosis should not be decided from guinea pig inoculation alone; laboratory aid and cystoscopic aid should be used to establish it. In the order of their importance these aids are placed by Braasch[2] as urography, microscopic study of catheterized ureteral specimens, cystoscopic data, clinical data, and particularly examination of the genitalia.

Ideally, the diagnosis should be made before any destruction of renal tissue has occurred though, of course, this is at all times extremely difficult; it is nevertheless true that carefully executed urinary examinations, scientifically conducted, and repeated urologic studies including cystoscopy and pyelography, as well as observation and study of suspected cases over as long a period of time as possible will aid materially in the recognition of early lesions of the kidney.

It would be a great advance indeed were it possible in this class of cases to prevent the loss of one kidney by nephrectomy through the cure of such lesions by means of appropriate physiotherapeutic measures.

CASE REPORT

E. S., female, single, eighteen years of age, a stenographer, was seen on April 26, 1924. Her complaint began two years before when she observed unusual frequency of urination; this occurred both night and day, and she sought relief when the frequency began to interfere with the necessary amount of sleep at night. Her medical attendant had made a diagnosis of cystitis and treated her for a number of months without any noticeable improvement and she was referred by him for a complete urologic examination. The only symptoms emphasized by this girl prior to the time I first saw her were frequency and slight discomfort in voiding. She had maintained weight of 120 pounds, which

was about average for her height, five feet two inches, although she lost five pounds in the five months prior to operation. Her father died of tuberculosis when she was an infant; her mother was living and well; she had two sisters living and well. Her color as a rule was good; the blood count practically normal, hemoglobin 90 per cent, although at times she would become easily fatigued and would look somewhat pale and even sallow. Her menstruation was normal in amount and character and occurred every twenty-eight days.

She had no previous illness, and auscultation of lungs and heart and percussion of the chest were negative. There was no tenderness anywhere over the abdomen and there were no masses palpable; a slight tenderness in the left loin could be elicited by pressure, and upon deep inspiration occasionally a pain of an indefinite location would radiate from the back down the sides of both legs; there was no nausea, vomiting, or attacks of renal colic.

At the first examination, a catheterized specimen of urine contained blood and pus in considerable quantity although it was straw-colored and but slightly cloudy, specific gravity of only 1002, and slightly acid in reaction. There were no casts, sugar or bacteria and a very few renal epithelial cells. On that day the right ureter was catheterized but an attempt to catheterize the left proved unsuccessful. The urine from the right kidney was negative except for a few red blood cells.

On May 6th the following report was sent to Dr. F. H. B. who referred the case:

"Cystoscopy revealed a highly congested bladder with a number of tiny ulcerations or tubercles at the fundus; the bladder capacity at its maximum distension was 90 c.c., and there were no trabeculations; the left ureteral orifice looked decidedly pathological, the right appearing practically normal. The left ureteral orifice had a punched out appearance, the edges of the elongated slit were irregular; there were flakes of a purulent material clinging just within the margins, and the surface would bleed on the very slightest instrumentation; congestion of the bladder mucosa was marked.

"The ureteral catheter was introduced with ease on the right side, but on the left an obstruction was met in the intramural portion of the ureter; another attempt was made to introduce a catheter of smaller size but it too was impeded by some obstruction or constriction.

"Roentgenograms of the entire genitourinary tract showed the outline of both kidneys, and their position seemed normal. There were no shadows suggestive of calculi visible in any part of the tract."

The tentative diagnosis made in this early cystoscopic report prior to a search for tubercle bacilli was that of a left pyelonephritis with ureteritis, resulting in infiltration of the ureteral wall and cystitis. The question as to the bacterial origin was to be determined by the process of culturing, searching for the tubercle bacilli by staining methods, and guinea pig inoculation with bladder urine, right kidney urine, or both.

Expectant treatment and careful observation were recommended together with periodic cystoscopy and careful efforts to dilate the left ureteral obstruction by the bougie or catheter; giving attention also to the cystitis, alkalinization of the urine and other palliative measures until a definite conclusion could be reached as to the possibility of restoring proper kidney drainage on the left side. If that were impossible or if tuberculous infection were strongly suspected after a while, a nephrectomy would be done and the result might well be favorably prognosticated.

Shortly after this preliminary report was made, the guinea pig inoculation with the bladder urine was carried out and a positive result was obtained; the right kidney urine, however, proved negative. In the meantime the palliative measures of treatment failed in every way to alleviate the patient's complaint of distressing frequency. This frequency was due to a high degree of sensitiveness of the bladder and the presence of numerous small ulcerations over its fundus and trigone and infiltration of its wall, together with a marked diminution in the capacity, so characteristic of tuberculous renal infections involving the bladder. Frequent attempts to find tubercle bacilli in the urine failed, due perhaps to errors in technique.

The girl entered St. Mary's Hospital, June 15, 1924, on which day her temperature was 99.2°F., the pulse 120, and the respirations 24. The urinalysis of the catheterized (twenty-four hours) specimen showed a specific gravity of 1015, straw color, acid reaction, normal urea content, moderate albumin, no sugar, no acetone, no bile, abundant pus, no blood and no epithelium.

The urine from the right kidney showed a trace of albumin, many blood cells, a very few

pus cells, normal urea, phthalein output 25 per cent in the first 60 c.c. of urine, otherwise negative. The stained sediment of both the bladder and the right ureteral urine did not show tubercle bacilli.

On the next day the catheterized bladder urine showed a yellow color, acid reaction, specific gravity 1007, urea a little less than normal, a trace of albumin, considerable pus, some epithelium, numerous bacteria but no tubercle bacilli in the stained sediment.

On June 16, 1924, the final preoperative cystoscopy was done under local anesthesia and there were found over the trigone and in the vicinity of the left ureteral orifice quite a number of small ulcerations suggestive of tiny tubercles; a few were seen near the fundus of the bladder. The left ureteral orifice was red, irregular in outline, and had a punched out appearance. The bladder sphincter was quite red and congested. Both kidneys were functioning. The urethra was negative, and the bladder capacity was from 80 c.c. to 120 c.c., distension to the latter limit causing much pain.

A No. 5 ureteral catheter met with an obstruction in the left ureteral canal 2 cm. within the orifice. Phthalein appeared in seven minutes. Catheters in the right ureter and the bladder were left for thirty minutes.

The temperature of this patient was normal for two days prior to the operation but the pulse ranged from 86 to 118, and the respirations remained at 20. Following the operation, however, on June 18, 1924, the temperature ranged from 99.2°F., minimum to a maximum of 100.8°F. until four days prior to her dismissal on June 30th, when it reached normal and stayed there. She remained in the hospital twelve days following the nephrectomy.

The operation was left-sided nephrectomy for tuberculosis of the kidney. A modified Mayo incision was used. The usual gridiron muscular division was carried out after the skin above and below was well undermined for two inches at least; this secured a wide exposure. The kidney was easily brought out of the wound. Double ligation of the renal vessels was employed to safeguard against hemorrhage, and the ureter was dissected out as far down as possible. Pure phenol was injected into the remaining portion and the distal portion of the ureter was ligated. The wound was closed with three layers of catgut and a small drain of rubber tissue was left, although this was not essential and is not the routine procedure. In this instance the ureter was dissected so low that the application of the ligature was difficult and so the apparent safeguard of drainage was utilized in view of the possibility of the ligature giving way.

Fig. 1. Tuberculosis of the kidney. Observe the thickening of the capsule. (Author's case.)

Fig. 2. Longitudinal section of tuberculous kidney: caseocavernous degenerative type. The opposite half of the kidney is strikingly free of involvement. (Author's case.)

The postoperative progress was not attended by any difficulties. The wound showed a decided tendency to heal; the drainage ceased in twelve days and the complete closure of the incision took place in twenty-six days. The portion of the ureter remaining gave no trouble whatever.

The capsule of the kidney was markedly thickened and very adherent. The kidney measured one-third more in length and weighed about one third more than the average kidney. The lower pole had a soft and boggy feel, and

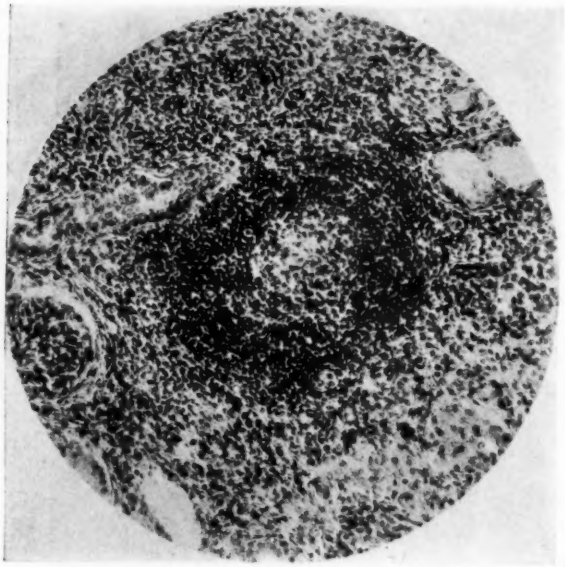

Fig. 3. Renal tuberculosis. Photomicrograph. Typical primitive tubercle formation showing the giant cells in the centre, and the zone of leucocytic infiltration at the periphery. (Author's case.)

contained a cheesy, pale fluid, with much white, flocculent material. The organ was considerably nodulated (Fig. 1). Cross section showed a striking example of the caseo-cavernous degenerative process in this case (Fig. 2), and microscopic section showed extensive degeneration and necrosis of the renal structure. Section through a small nodule showed intense fibrosis with numerous areas of lymphocytic infiltration. Definite tubercles were present in large numbers. (Fig. 3.)

The results of this operation have been more than satisfactory in every respect; the persistence of the bladder irritability was annoying for a short while but this has disappeared. The bladder capacity has now greatly increased amounting at times to as much as 130 c.c.

The patient's general health is good. She has gained ten pounds in weight and she has been actively engaged in her vocation as stenographer since her postoperative recovery. Under the influence of fresh air, hygienic care, and artificial as well as natural sunlight, she is showing decided progress toward complete recovery.

There are a very few tiny ulcerative spots at the fundus; air distension of the bladder with the patient in the knee chest position causes them to bleed; the remaining bladder mucosa looks normal. No tubercle bacilli have been found in the urine after repeated examinations; however, a small amount of sterile pus persists in the bladder urine. Guinea pig inoculations with the bladder urine and the catheterized specimen from the right kidney proved negative for tuberculosis.

OCCURRENCE

The percentage of tuberculous lesions in surgical disease of the kidney is about 30. In 20, 770 autopsies Kapsammer found 191 cases of renal tuberculosis, or a little less than 1 per cent.[3] It seems that the disease is more prevalent in the male than in the female, but the diagnosis is less difficult in women, hence more cases come to operation. In the early stage the disease is unilateral; later it becomes bilateral. Bilateral involvement is much more frequently observed in children than in adults. Renal tuberculosis is essentially a disease of young adult life, and is most common between the ages of twenty and forty. Kelly's youngest case was sixteen years and cases have been reported under one year, others under ten years, whilst the number occurring over ten years is much greater. In a series of autopsy studies it is usual to observe a relatively higher percentage in children than in adults.

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CASE REPORTS BY DR. RUSSEL H. PATTERSON

NEW YORK

DIVERTICULOSIS OF THE LARGE INTESTINE*

CASE 1. This patient, No. 79116, was first seen in the Department of Surgery at Cornell Clinic in June, 1927.

Since the fall of 1924 the patient had been having abdominal symptoms consisting of a lump in the left side of her abdomen accompanied by dull aches, occasional sharp pains in the left lower quadrant, and sometimes severe cramps in the middle of the abdomen. The pains felt like "an ice pick stuck in the stomach and left there." The pains had a tendency to radiate around to the left back and were relieved somewhat by rest and counterirritation. She had lost strength, felt weak, but had lost no weight. She had no desire for solid food. Her bowels were always constipated. She took laxatives often. In May, 1927, she began to have rectal bleeding and an increase of pain in the left lower quadrant. She would pass blood clots and sometimes "gushes of blood" after a stool. She had no gastric symptoms, and no fever or signs of acute inflammation.

Past history: Operation for hernia at The Hospital for Ruptured and Crippled in 1914. Menopause, 1924. Treated in the Gynecological Clinic at Cornell from 1925 to 1927 for First Degree Prolapse of Uterus with Cystocele and Rectocele. She has three children living and well.

Physical examination: Obese Irishwoman, aged fifty-two. Temperature 99°, pulse 94, weight 143 lbs., blood pressure, 168/100. Pale skin. Pendulous abdomen with tenderness on moderate pressure in the left lower quadrant. Proctoscopic examination showed a small rectal polyp with necrotic tip 12 cm. inside the rectum. Barium enema met no obstruction. The sigmoid, descending and transverse colon appeared spastic. There were scattered throughout the bowel small round areas of increased density. The cecum was smooth and freely movable. A seventy-two hour motor meal gave roentgenograms similar to those of barium enema. The appendix was long and beaded. The stools showed occult blood.

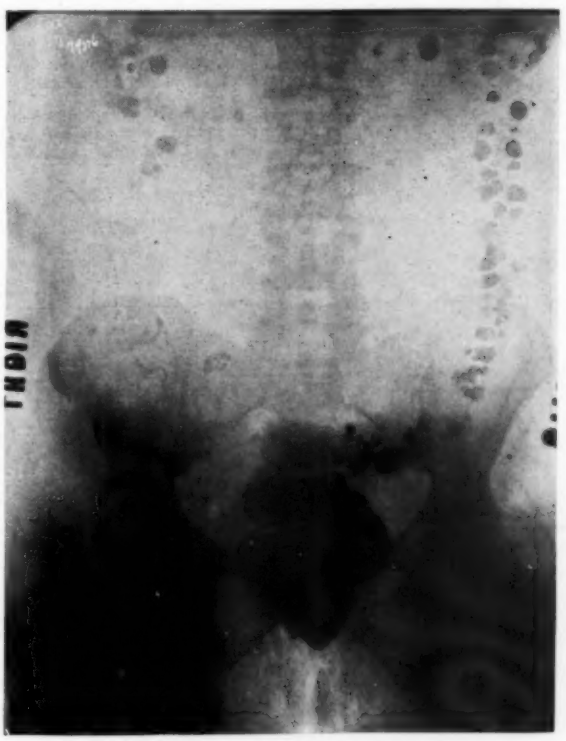

Fig. 1. Diverticulosis of large intestine.

Progress of case: Because of the severity of symptoms the patient was admitted to Bellevue

* Read before Section of Surgery, New York Academy of Medicine, January 6, 1928.

Hospital, Dr. Harold Santee's service, where she was kept in bed two weeks and given five warm colonic irrigations at two day intervals. She improved and was discharged for further treatment in Cornell Clinic. She has been given barium sulphate meals by mouth at four to six week intervals. She has been much improved, back to her work, has had rarely a slightly blood streaked stool when constipated; she has been practically free of abdominal pain and cramps. Abdomen is soft. She has had a cold for past two weeks. When constipated she has taken milk of magnesia before meals.

The case is presented as one of diverticulosis, with severe symptoms, greatly relieved by meals of barium sulphate as given for a gastro-intestinal series.

PNEUMOPERITONEUM*

CASE 1. E. B., age twenty-nine, male. This patient was admitted to Bellevue Hospital, March 25, 1926, and discharged April 24, 1926.

FIG. 1. Pneumoperitoneum. Diaphragm elevated 4 in.

Present Illness: Three weeks before admission to Bellevue Hospital patient came down suddenly with pneumonia. He became very seriously ill four days after the onset. He was given oxygen for forty-eight hours. Following this his abdomen became markedly distended. The patient attributes the abdominal distension to the oxygen intake. The pneumonia cleared up by crisis but the temperature remained around 99°–101°. The day before patient was admitted to Bellevue Hospital Dr. Liggett Lincoln of the Cornell Medical Division at Bellevue tapped the chest with a 20 c.c. Luer syringe between the seventh and eighth ribs on the right side near the angle of the scapula and aspirated thick pneumococcus pus. Next day the patient was sent to Bellevue Hospital and was admitted to Dr. Harold Santee's division. The distension of the abdomen continued.

Physical examination showed an undernourished man. Temperature, 100°, pulse, 120, respirations, 24. There was dullness of the entire right back from the spine of the scapula down. The abdomen was generally distended and tympanitic throughout. Ordinary liver dullness not present. Roentgenographic examination of the chest by Dr. Irving Schwartz taken the day after admission showed fluid in practically the whole right chest. The diaphragm was elevated some 4 inches on both sides. A diagnosis of pneumoperitoneum was made.

On the day after admission to the hospital the empyema was operated on. Two inches of the eighth rib in the posterior axillary line was resected. A large double rubber tube was inserted just through to the pleura. The cavity in the chest contained more than a pint of thick creamy pus. The cavity was bounded beneath by the right side of the diaphragm, ran upward and backward toward the angle of the scapula, both in front and in back of dome of diaphragm.

Seven days after admission to the hospital the patient's abdomen was still distended and was causing him considerable discomfort. He was taken to the operating room and under local anesthesia a one inch incision was made through the left rectus muscle, just below the xiphoid process. When the peritoneum was opened, air under very low pressure came out of the abdominal cavity. The air had no odor. There was no sign of peritoneal irritation. The stomach seemed normal and not distended. The transverse colon was moderately distended. Upon pressing the left upper quadrant of the abdomen small gushes of air would make their way out of the wound. An attempt was made

* Read before Section of Surgery, New York Academy of Medicine, January 6, 1928.

to collect some of the air in a bottle for chemical examination. This was unsuccessful. The wound was closed with interrupted chromic catgut and two silk stitches in the skin. Patient sent back to the ward and was somewhat more comfortable after the operation. His abdomen gradually began to go down and at the end of the fourth day with the help of enemata and pituitrin his bowels moved well, and on the fifth day his abdomen was practically normal. His empyema was treated by the Carrel-Dakin method and he was discharged from the hospital one month after admission with a small granulating wound at the site of his empyema operation.

He has been seen at regular intervals in the return clinic. He has gained weight and has no symptoms whatever. Roentgenograms taken of his chest July 13, 1927, are negative except for slight thickening of the pleura in the right costophrenic angle.

The case is presented because of the unexplainable air in the peritoneal cavity. We would call attention to the fact that the abdomen was distended six days after the onset of illness and fourteen days before the thoracic diagnostic puncture. There was no evidence of diaphragm injury at time of rib resection. We have not found any other case similar to this in the literature.

SOLITARY CYST OF THE KIDNEY*

Paul W. Aschner, M.D.

NEW YORK

THIS was one of Dr. Rothschild's patients, a woman of fifty, with a mass in the right upper quadrant. Gallbladder and colon examinations were negative. Her urine contained some pus. A roentgenogram examination showed the left kidney well-outlined; the right kidney was also seen, but below it was a very definite circular area of density, about 10 cm. in diameter. When cystoscoped an obstruction was found in the right ureter at 18 cm. This was overcome with the catheter and 25 cc. of purulent urine was aspirated from the renal pelvis. A pyelogram was then made which showed a moderate degree of hydronephrosis, with blunting of the calices. Then the catheter was withdrawn to the lower end of the ureter and the injection was again made, and showed a filling defect of two and a half inches in the ureter at an area corresponding to the mass seen in the plain plate.

I made a diagnosis of retroperitoneal tumor which could not be absolutely attributed to the kidney. At laparotomy, performed by Dr. Berg, a solitary cyst attached to the lower pole of the kidney was found. It was densely adherent to the ureter. The cyst was removed intact.

The patient made a good convalescence, and the urine cleared up completely.

* Read before Section of Genito-Urinary Surgery, New York Academy of Medicine, January 18, 1928.

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EDITORIALS

BACK INJURIES IN INDUSTRIAL PRACTICE*

MAURICE CAMPAGNA, M.D.

NEW ORLEANS

BACK injuries occurring in industrial work have proven a source of great concern to the industrial surgeon. As a general rule the examiner approaches the man complaining of a "sprained back" with not a little trepidation. There seems also to be an air of antagonism on the part of the patient upon reporting his "accident." There are several explanations for this curious state of affairs.

From the doctor's standpoint it may be that he cannot correlate a back injury met with in a workman with any known anatomical pathology, neither is there any tangible physical finding upon which he can base his prognosis or treatment. To this may be added the fact that the patient himself is not at all convinced that his alleged pain is the result of an accident. With the exception of the cases due to direct trauma, a past history of some pain in the lumbar region will probably be obtained.

Unquestionably there is some pathology to account for the symptom complex met with in these cases. It is hard to believe that all these men present themselves with similar symptoms, the bases for which are either fictitious or of obscure origin. In all cases the onset is relatively acute, more in the order of an exacerbation, However, the patient is cognizant either of some past trouble or of an insidious indication of impending trouble.

For the purpose of study 4350 industrial accidents covering a period of two years, were reviewed. Both white and colored patients were considered. Of this number 250 were cases of back injuries.

In Table 1 we note that, excepting in

* Statistics taken from the Medical Department of the Union Indemnity Company of New Orleans, Louisiana.

one or two instances, the difference in the white and colored man is negligible. It is to be noted that according to this series of cases sacroiliac involvement is rare. The diagnosis of sacroiliac arthritis was made only when the joint could not be definitely ruled out after the most careful orthopedic manipulations. The age incidence was found to be surprisingly low. Old fashioned lumbago and sciatica have generally been associated with a person well advanced in years.

Table I

	White	Colored
Number of cases	107	143
Average age	33 years	33.7 years
Average disability	7.9 days	8 days
Medical expense to company	$7.78	$6.15

Under proper treatment, however, it can be seen that the average time of disability can be reduced to the period of expectancy required by the state compensation laws. The medical expense incurred in treating these cases consisted chiefly in the doctor's fee and the supplies and equipment incidental to any well furnished office. In no case was a brace, belt or other appliance employed. This medical expense compares favorably with the average expense of other minor industrial accidents.

As to the etiology of back injuries, in only 42 cases were the accidents attributable to direct trauma. In other words only 16.8 per cent of all back cases gave a history of a direct blow to the site of alleged pain. In 16 cases it was possible to demonstrate gonococci in the urethral secretion. Incidentally all 16 cases were negroes. Therefore it can be seen that it becomes of paramount importance to understand the pathology of the vast majority of patients complaining of back pains.

Table II

	White	Colored
Sacroiliac	3	3
Direct trauma	15	27
Genitourinary infection	0	16

Cases of back injuries as a general rule give a rather vague history of lifting something heavy or being thrown off their balance while carrying some heavy object. The sensation experienced is as though something "gave way" in the region of the lumbar vertebrae. Apparently sufficient pain is not immediately suffered to warrant calling the doctor, for in the majority of cases medical aid was sought from twenty-four to thirty-six hours after the alleged accident.

On examination the majority of these patients were found to be well developed in musculature. The back proved to be negative for external evidence of injury excepting for some amount of rigidity of the muscles supporting the vertebral column on either one side or both. This rigidity, however, is not sufficient to prevent the patient from bending forward to touch his toes without bending his knees or in swaying from side to side.

A focus of infection has been found to exist in all cases, the most common places being the teeth and the intestinal tract, manifested in the form of an obstinate constipation. Relatively few cases were sent for roentgen-ray examination because of the expense, but of those cases sent a "lipping" or spur formation with other hypertrophic changes could be demonstrated in all cases.

The treatment is routine and relatively simple, some variation being employed in the sacroiliac case, and for the individual who for some reason cannot leave his employ:

(a) Removal of foci. (b) Administration of 2½ ounces of a saturated solution of magnesium sulphate to which was added either a little essence of peppermint or lemon extract to render the dose more palatable. (c) Daily physiotherapy in an electric "baker" for thirty minutes, in severe cases twice daily. (d) Massage to the back, using a rubefacient. (e) Applica-

tion of hot compresses for a period of thirty minutes. The last two named are carried out by the patient's relatives at home upon his retiring.

In the case of sacroiliac involvement or in those cases that elect to remain at work, the above treatment is augmented by the application of adhesive to the back. The method of application is of some importance even though it is easily applied. All hair in the pubic and lower abdominal region should be shaved. The adhesive used should be three inches wide and of sufficient length to reach well within the inguinal region on both sides. Strap from below upwards, having the patient well braced so that a moderate degree of firm pressure can be applied. At least four pieces should be used.

Back injuries play not a little part in industrial practise and are an important factor in industrial insurance. In this series of cases there was a total expenditure of $1,684.55 in medical expense alone and an economic loss in earning capacity of one thousand nine hundred and sixty-three days, or approximately five and four-tenths years.

Table III

	White	Colored	Total
Total days lost	829	1134	1963
Cost in medical expense only	$817.35	$867.20	$1,684.55

BRITISH LETTER

To those who have followed the numerous and various discourses on the treatment of acute appendicitis in the past fifteen years, that of H. H. Rayner, M.B., F.R.C.S., to the Manchester Surgical Society on this most important subject cannot fail to be of great interest. He points out that, although according to statistics the number of deaths in this country from appendicitis has apparently not diminished for the past fifteen years, the figures given really require some explanation; otherwise they are misleading.

He quite rightly suggests that in the period under observation there has been recorded not only a great increase in the number of cases, but he assumes that, the element of error in diagnosis being considerably lessened, the disease has also been more frequently notified. Figures in support of these statements are drawn from reports of the Manchester Royal Infirmary, one of the largest general hospitals in this country. Averaging the admissions to this hospital of cases of acute appendicitis, he finds for three years, 1913–15, there was an annual take in of 550 cases, being 5.4 per cent of the total admissions with an average death rate of 12.6 per cent, whereas in the years 1924–26, 830 cases were admitted, being 7.6 per cent of the total admissions with an average mortality of 5.8 per cent.

In discussing the well worn theme of immediate versus deferred operation in certain particular cases coming to the notice of the surgeon after perforation or the onset of peritonitis, he gives his own experience of a recent series of 245 consecutive cases. In these there were ten deaths, a mortality rate of 4 per cent; of these 193 were operated on immediately with seven deaths, a mortality rate of 3.6 per cent, whereas fifty-two had the operation deferred and of these three died, giving a mortality rate of 5.7 per cent. This last series of fifty-two cases were chosen from a large group of patients showing signs of local peritonitis. In no case was operation deferred in patients observed to have a spreading or diffuse peritonitis.

Rayner acknowledges the trend of opinion in the past twenty years in considering that an attack of acute appendicitis demands an urgent operation. At the same time he admits that this treatment is correct in only 10 to 20 per cent of the cases. The other 80 per cent call for most careful investigation and discrimination as to when and how to operate. This at first

seems a general deduction against the general teaching of today, that when once the existence of an acute appendicitis has been established there can be no excuse to justify the postponement of operative measures, and his own figures do not appear to warrant such a conclusion. His chief argument, however, in defending this assumption appears to rest on the fact that, owing to the increasing frequency of the disease, there is an increasing likelihood of the operative work being undertaken by practitioners who have not the training and experience to fit them to perform an operation which may be extremely difficult and dangerous. Hence this call to a halt for more mature deliberation and the necessity for the skill and guidance of the experienced surgeon. He quotes particular cases in which in his opinion it may be to the patient's general advantage and safety to defer operation.

With regard to operative technique, he is in favor of the paramedian incision, particularly in cases in which there is evidence of peritonitis. In such cases drainage is easily attained, if required, without making any additional wound. The possibility of fouling the peritoneum in reaching any infected field is avoided by adequate packing. After this step and the gentle wiping away of any pus that may be present, the appendix is sought for. He emphasises the fact that with this exposure an appendix low in the pelvis or placed high behind the colon can be extracted more easily than through the McBurney incision and with less liability to rupture, more especially if the base is first divided. The rupture of an acutely inflamed and distended appendix and the consequent soiling of the peritoneum, are likely to be followed by serious sequelae during the period of recovery and therefore great care should be taken to avoid this accident. The necessity of mobilising the inflamed, swollen and rigid lower ileum (ileus duplex of Handley) found in late cases with peritonitis and pelvic abscess by freeing it from the fibrinous adhesions which fix it to the posterior pelvic wall and adjacent loops of bowel (a most important step), is rightly stressed. If this is done, provided the patient is supplied with ample fluid in the next forty-eight hours by the rectum and subcutaneously, there will be no need for a short circuiting operation or an enterostomy. With regard to drainage Rayner says:

> Its dispensation should depend not on boldness of spirit but on good technique in the performance of the operation.

In after treatment in cases of pelvic and diffuse peritonitis, he emphasises the importance of an adequate supply of fluid, which must be given by the rectum or subcutaneously, the evil effects of purgatives and the value of gastric lavage. He says the griping pains and vomiting which may occur on the third to fifth day are more likely to come on if there has been laxity in these fundamental principles of treatment, and should lavage then fail a simple enterostomy will be indicated. Lastly he issues a note of warning to beware of the patient who has a persistent cough and badly infected wound, as the sutures may cut out, and if the tension is not relieved by supporting the suture line with a corset of adhesive strapping, it is by no means a remote possibility that the wound will give and the abdominal contents be extruded into the dressing.

Another paper on appendicitis from the pen of Ruth E. Millar, M.B., F.R.C.S.E. and George Robertson,[1] F.R.C.S.E. (Dunfermline) deals with late cases of acute perforative appendicitis with peritonitis in young children, and brings forward a method of treatment which they say offers, in almost hopeless cases, a prospect of success. Having had such a case recently under my care, I adopted the routine and feel convinced of the soundness of the general principles. I, therefore, do not hesitate to give the major details from their

[1] *The Practitioner*, 120: 257, 1928.

article. The type of case involved is practically a neglected sick child of four or five years or thereabouts with a history of several days illness, starting with abdominal pain and persistent vomiting in the last phase. The child's extremities are cold and bluish, the pulse rapid and feeble; the restlessness of the little patient intensifies its already tired and anxious look. The whole abdomen is distended, tender and rigid, and altered blood is vomited frequently in small quantities. The vomit is not forcibly ejected because the already rigid abdominal muscles give little assistance to the act of vomiting. The breath and vomit smell strongly of acetone. The child, mildly delirious, is rapidly dying. The prognosis by operation is bad. In fact, the condition is desperate and one is faced with two alternatives, either to adopt the Ochsner treatment or a very rapid operation. Both are difficult and dangerous and it is a very rare occasion that the child's life is saved.

The technique of the method briefly is, first, to remove the gangrenous perforated appendix and evacuate the pus in the abdomen. This must be undertaken without a general anesthetic. The difficulties of using a local anesthetic in a toxic and restless child can be overcome by careful infiltration of the abdominal wall, the child being held firmly and steadily by capable nurses and its attention diverted as far as possible. By this means the abdomen can be entered painlessly and some pus allowed to escape. The surgeon's forefinger is now introduced, breaking down recent adhesions and opening fresh pockets of pus, working from the left to the right. During this stage, pain will be produced and it is advisable to give a whiff of ether a little previous to this stage of the operation and particularly before separating adhesions from the parietal peritoneum and removing the gangrenous appendix. Drainage is instituted, one tube being placed at the upper end of the wound into the right kidney pouch, a second tube being passed into the pelvis from the lower end of the incision. A cone of the cecum is now made to project from the wound between the upper and lower drainage tubes. Two through and through silkworm sutures passing through the abdominal walls on either side of the cecal protusion serve to close the abdominal wall and retain the drainage tubes in position. A rubber catheter of small calibre is fixed in the cecum by Witzel's method; only 3 or 4 inches are utilised outside the gut, the rest of the catheter being cut off and discarded. A pint of saline, bicarbonate and glucose solution is introduced thus into the cecum and ascending colon. The first half pint is allowed to flow as rapidly as the catheter will permit, the second half pint much more slowly. The catheter is immediately closed with a light clip and lies upon the immediate wound dressings. The alkaline, saline, glucose solution is repeated, three-quarters of a pint being given every two hours. The writers affirm:

> The result of supplying this fluid to the thirsty colon is nothing short of magical; almost before one's eyes and within a few minutes of the injection the child may be seen to fall asleep as if an opiate had been given. The other injections repeated at two hourly intervals are similarly followed by peaceful sleep. The vomiting rapidly disappears and the transformation in the appearance of the child is wonderful. The pulse improves rapidly and the child is soon on the high road to recovery. The rapid absorption of fluid from the colon in such a case is well shown by the fact that even after several pints have been administered no action of the bowels per rectum has followed. The abdominal walls relax and the rigidity and tenderness rapidly disappear.

At a joint discussion recently held at the Royal Society of Medicine, the subject of chronic appendicitis in children was debated both from the standpoint of the physician and of the surgeon. Mr. G. E. Waugh, F.R.C.S., was in the chair and Dr. Robert Hutchison in opening the debate from the physician's standpoint stated that although chronic appendicitis in childhood may be rare it does, however,

exist, and that it is an open and at the same time an academic question whether it follows on an acute attack or is a chronic disease from the beginning. With regard to the symptomatology he points out the fact that at this early age it is an affection of the colon that is apt to be simulated, whereas in the adult it is the gastric symptoms which are predominant in the so-called "appendix dyspepsia" of chronic disease.

In the child the clinical picture presented, he believes, is one in which the cardinal features consist in recurring episodes of abdominal pain, with or without vomiting, and slight fever. Of this triad of symptoms lower abdominal pain is the most constant and important.

After briefly discussing the differential diagnosis from (1) other organic lesions in the right iliac region, e.g. enlarged glands, kinking of the ileum, etc., (2) ureteric obstruction, (3) pelvic affections in girls, (4) intestinal colic, and (5) acidosis attacks, he gives the following advice as to treatment:

> Given a child who is subject to recurring attacks of abdominal pain with or without fever and vomiting, in whom after careful consideration of the history and physical signs there is reason to suspect that chronic appendicitis may be the cause, I do not hesitate to advise, not appendicectomy, but exploration of the right iliac region. I am especially inclined to give this advice, (1) if the child is going to school or abroad and will not be within the reach of immediate surgical help if need be, (2) if the parents are worrying much about the possibility of appendicitis and (3) if there is a strong family history of the disease.

Mr. A. J. Walton, speaking from the point of view of the surgeon, confessed that although he had had a good deal of experience with appendicitis he knew but little of the chronic condition in children. To make good this deficiency he had investigated some 305 cases of his own, labelled "chronic appendicitis," and found that of these only thirty-three had occurred in children under fourteen years. On looking further into the records of these patients, he found that seventeen had had a previous acute attack, five cases were found to have subacute or chronic inflammatory changes in the mesenteric glands, more especially those at the ileocolic angle, and five cases were associated with visceroptosis. In four cases thread worms were found to be contained in the lumen of the appendix. In two cases no pathological lesion was found. He is therefore led to the conclusion that as his own cases reveal not a single case of appendicitis chronic from the beginning, such a condition does not exist unless those in which thread worms were found in the lumen are considered as such.

In the discussion that ensued, opinions were to a considerable extent divergent as to the character of the symptoms and the cause, even when the speaker assumed that chronic appendicitis was a separate and definite clinical entity in children. The chairman, Mr. H. G. Waugh, F.R.C.S., towards the close of the debate made some observations which are important, interesting, and in many ways unique, being based on experience with over 500 cases of what he called "chronic appendicular trouble" in children. He preferred this term to chronic appendicitis, thus implying a purely clinical problem of which the symptom complex might be considerably varied and did not justify an exact pathological classification. He referred to two specific types of chronic inflammation only, (1) the primary tuberculous affection of the appendix which attracted attention by the intensity of the pain, unassociated with toxemia and for which a cure could be effected by removing the grossly tubercular appendix, and (2) a streptotrichal lesion in which the patient ran a high evening temperature, 105 or 106°F. at night, dropping to 99° in the morning, with vague abdominal discomfort. After some weeks a small tender and circumscribed swelling appeared in the abdomen suggestive of an encapsuled, chronically inflamed appendix. At operation the

injected and swollen condition of the appendix apparently supplied satisfactory explanation of the previous symptoms, but unfortunately hopes of cure would be dissipated by a return of the swinging temperature, and the fact that the child was slowly getting worse. After some time the tell-tale tumuli with crateriform openings occurred along the line of the scar, or even on the chest wall indicating that the cause had been an actinomycotic infection throughout, which could have been checked and stopped by the administration of tincture of iodine in milk.

Of the symptom complexes as distinct from inflammation, he described three:

1. The child had a "pricking" sensation in the right iliac fossa and a slight stomach ache. A very definite type of appendicular lesion was present in which the appendix was v-shaped, with the distal part slightly swollen and the proximal part narrowed, and in which a vestigial band between the two segments tied it down to the posterior abdominal wall. He thought the explanation was that the loaded bowel pulled on this fixed point, causing the "pricking" sensation complained of, and some distension of the distal portion was caused at the same time, producing the slight stomach ache.

2. The case in which the child was noticed to clutch at the end of the urethra and scream with pain at the termination of the act of micturition. In such a case if we can exclude by careful examination any affection of the genitourinary tract we are right in assuming that the appendix is at fault and its removal will relieve this symptom complex.

3. A rarer syndrome is that seen in a child in apparently perfect health who at weekly, perhaps monthly, intervals quietly empties the stomach without appearing to be ill either before or after. The first thought would be of an intracranial lesion, but when a meticulous investigation has failed to reveal any explanation at all, this symptom complex will be relieved by removing the appendix.

Waugh, by citing these particular symptom complexes, emphasizes the difficulties in the diagnosis of what may rightly be termed in the clinical sense "appendicular disease" or "chronic functional disturbance of the appendix." There is no definite pathology but probably there is entailed some variable anatomic abnormality which demands the removal of the appendix in order to bring about a cure of certain obscure and baffling symptoms.

John H. Watson, M.D., F.R.C.S.
Burnley, England.

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[From Fernelius' Universa Medicina, Geneva, 1679.]

BOOKSHELF BROWSING

JOHN MORGAN, M.D. FOUNDER OF AMERICAN MEDICINE

THURSTON WELTON, M.D.

BROOKLYN

JOHN MORGAN, styled the founder of American medicine, was born in Philadelphia in the year 1735.

At that time one went abroad to earn the degree of Doctor of Medicine. In America the highest grade of medical achievement was derived from the resources of private practitioners, who might or might not be well informed. Those who returned to the Colonies after years of medical study in Great Britain or on the Continent were looked upon with great favor and their services eagerly sought, especially by the well-to-do.

John Morgan was the oldest son of Evan Morgan, a native of Wales who emigrated early to Pennsylvania. The younger Morgan was placed at an early age at Nottingham School under the direction of the Rev. Mr. Finley. He entered the College of Philadelphia (later the University of Pennsylvania) and was a member of the first class graduated, in 1757. He was given the degree of A.B. Morgan studied medicine with Dr. Redman, performing the usual tasks of an apprentice, and upon the expiration of his indentures entered the Provincial army as surgeon. He showed great merit and promise while serving in this capacity. He resigned his commission in 1760, at the conclusion of the French war, and sailed for Europe to perfect his medical knowledge.

While in London he had the benefit of instruction from the hands of the Hunters and of Hewson. In 1763 he was graduated with the degree of Doctor of Medicine from Edinburgh. His thesis upon this occasion was written upon the subject of the formation of pus.

While in England Morgan became proficient in the art of injecting organs with wax and preparing them by subsequent corrosion. While in Paris studying under the distinguished anatomist, M. Sue, Morgan prepared a kidney by this method, which achievement led to the distinction of admission as a member to the Academy of Surgery of Paris. In addition he was elected a member of the Royal Society of London, admitted as a licentiate of the College of Physicians of London, and became a member of the College of Physicians of Edinburgh. He was also made a member of the Society of Belles Lettres of Rome.

He visited the justly famous Morgagni at Padua and an account of this visit in a letter written by Morgan is fascinating reading.

While in Europe Morgan must have

dreamed dreams and spent endless hours speculating upon the conditions surrounding the practice of medicine in the Colonies.

The College of Philadelphia was founded in 1749. Nineteen years later, due to Morgan's genius and peculiar abilities, the medical school was engrafted upon the parent college.

Entertaining a high sense of Dr. Morgan's abilities and the high honors paid to him by different learned bodies and societies in Europe, they unanimously elected him Professor of the Theory and Practice of Physic.

Thus, the first medical professorship in America was created.

It has long been an academic question as to the priority of conferring medical degrees in America. The degree of Bachelor of Medicine was conferred, in 1769, by King's College (Columbia University), and the degree of Doctor of Medicine in 1770. In June, 1768, at the commencement of the College of Philadelphia, the degree of Bachelor of Medicine was conferred. Joseph Carson, M.D., in "A History of the Medical

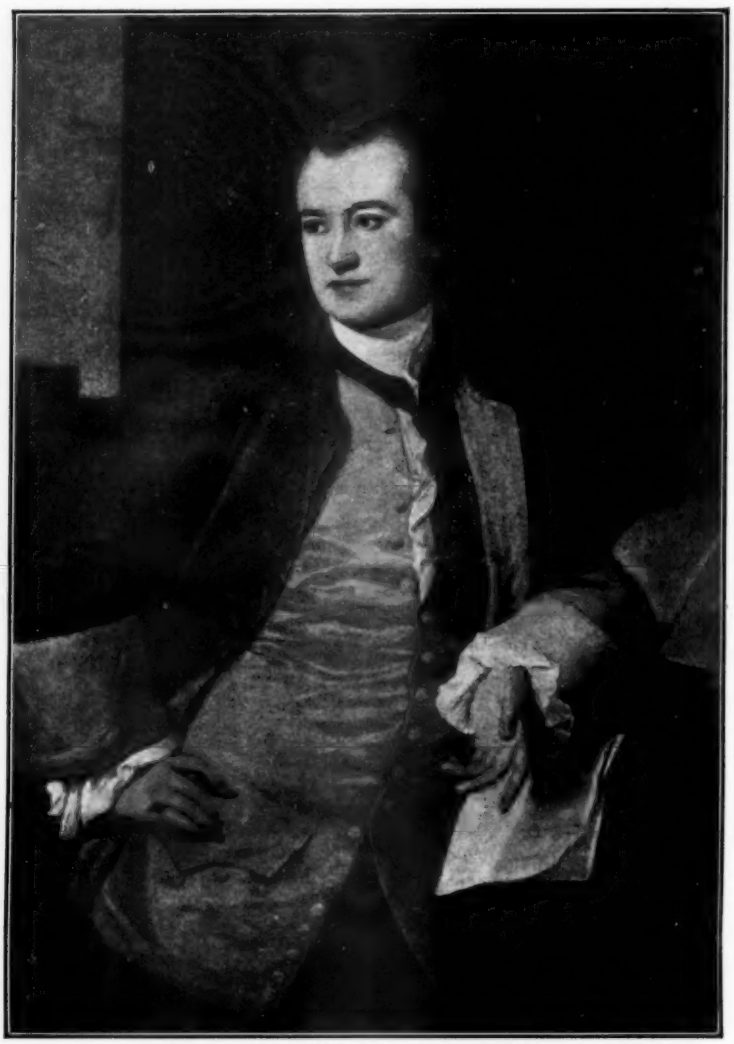

Fig. 1. John Morgan (1735–1789).

We read that:

> Franklin drew up the plan of an academy in the city of Philadelphia, suited to the state of an infant country. . . . He looked forward to the period when an institution on an enlarged plan would become necessary. . . .

On May 3, 1765, the minutes of the Board of Trustees of the College state:

Department of the University of Pennsylvania" (1869), disposes of the question by deciding:

From this it appears that the claim of priority in conferring degrees in medicine must be awarded to the Philadelphia School, while the precedence in conferring the Doctorate must be given to New York.

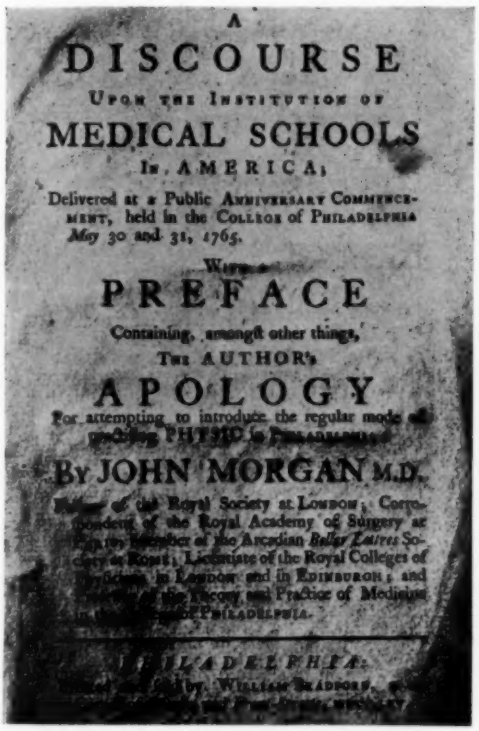
A
DISCOURSE
Upon the Institution of
MEDICAL SCHOOLS
In AMERICA;
Delivered at a Public Anniversary Commencement, held in the College of Philadelphia May 30 and 31, 1765.
With a
PREFACE
Containing, amongst other things,
The AUTHOR's
APOLOGY
For attempting to introduce the regular mode of practising PHYSIC in Philadelphia.
By JOHN MORGAN M.D.

Fig. 2. Title of Dr. Morgan's inaugural discourse.

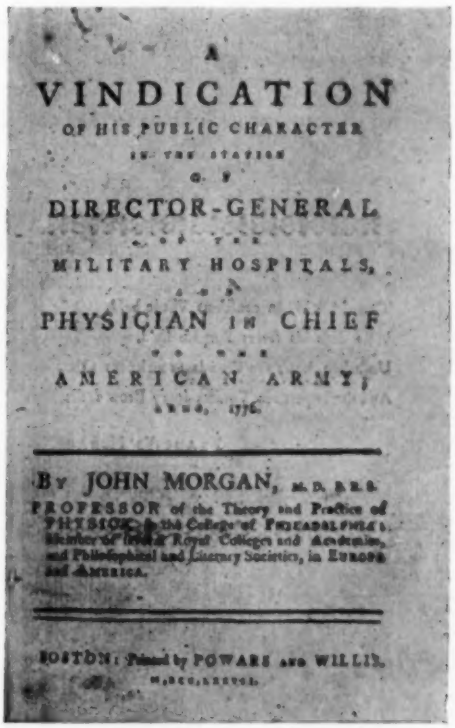
A
VINDICATION
OF HIS PUBLIC CHARACTER
IN THE STATION
OF
DIRECTOR-GENERAL
OF THE
MILITARY HOSPITALS,
AND
PHYSICIAN IN CHIEF
OF THE
AMERICAN ARMY;
By JOHN MORGAN, M.D. F.R.S.
PROFESSOR of the Theory and Practice of PHYSICK in the College of PHILADELPHIA;
BOSTON: Printed by POWARS and WILLIS.

Fig. 3. Title page of the Vindication.

At the public commencement of the College which took place May 30 and 31, 1765, Dr. Morgan delivered his famous Inaugural Address, entitled, "A Discourse Upon The Institution of Medical Schools in America." This work had been prepared while Dr. Morgan was in Paris.

Inasmuch as an excellently preserved copy of this small work chanced lately into my hands and I had the satisfaction and pleasure of reading it, perhaps it will not be without profit if I quote from it at random.

The title page reads, "A Discourse Upon The Institution of Medical Schools in America . . . Delivered at a Public Anniversary Commencement, held in the College of Philadelphia May 30 and 31, 1765. With a PREFACE Containing, amongst other things, The Author's Apology For Attempting to introduce the regular mode of practising PHYSIC in Philadelphia. By John Morgan, M.D." It was published in 1765.

The book opens with the usual dedication, clothed in the flowery language of the times. Then follows the preface in which Dr. Morgan outlines his medical creed, dwells upon the state of practice in America and how he proposes to practice, and makes other observations of a general character.

Early in his preface he writes:

First, I propose to confine myself, in practice, to these cases, which belong most immediately to the office of a Physician, that I may prescribe for and attend such cases to greater advantage. I shall therefore avoid, all I can, interfering in the proper business of surgery viz. manual operations.

Not a bad code for many physicians to observe to-day.

Secondly, I propose, in such cases as shall be required, to attend in consultation with other Physicians, on the same terms as those of character enter into consultation with one another.

Thirdly, I shall give my opinion in writing on the complaints of patients at a distance from Philadelphia, whenever the history of the case is properly drawn up and transmitted to me for advice.

Fourthly, in such cases as surgery require consultation, or the use of medicines I am willing to attend, prescribe, consult, or advise; but not to perform any operation myself, or dress any wound.

Morgan follows with the heading, "In Regard to the Apothecary and Surgeon." At the time it was the custom for the physician to compound and dispense the drugs necessary to each case. An apprentice usually did the manual labor involved. Also, every physician undertook every type of case. The day of the specialities had not dawned. It will be recognized that Dr. Morgan drew a clean line between medicine and pharmacy, as we know it to-day. He also differentiated between physic and surgery. He announced that he had brought a Mr. David Leighton, educated in Great Britian both in pharmacy and surgery, to join him. He writes, "To him I send to make up my prescriptions." But if he wished, the patient could choose another apothecary. Dr. Morgan insisted that he was to be paid merely for his advice and the medicines and operations were to be considered as a distinct and separate charge. In taking this stand, revolutionary at that time, Morgan really inaugurated the science of pharmacy as a distinct calling. One may also reason that he started the specialities in medicine by calling attention to the two branches, physic and surgery.

In the preface he dwells upon the question of fees. He says:

I always mean that these shall be moderate, adapted to the circumstances of this place, of the patient and the attendance he may require.

The paying of a physician for attendance and the apothecary for his medicines apart is certainly the most eligible mode of practice, both to patient and practitioner.

Instead of making a charge of fees, I willingly leave to the patients themselves to give what they please, upon my dismission from further attendance, or as soon after their recovery as shall be thought convenient, without specifying any demand, unless patients particularly require it. This I look for to prevent the necessity of making a book charge of fees, which is never done in any liberal profession.

As to attending poor patients gratis, and giving them my best advice; I shall chearfully take my share of that kind of practice with my breathren of the faculty . . .

Under the title, "The Necessity of Regulating the Practice of Physic," Dr. Morgan writes:

Formerly, when the city did not occupy much above half of the extent, practice was much more manageable than it is at present. Living was then cheap. Within my own memory, every article of expense was less by almost half. [Haven't most of us heard something along these lines since the War? Ed.] A medical education is at least become more expensive. . . . Is it not then more equitable to be paid for attendance, than to live by advancing the price of medicines?

I am not urging these as arguments for a more expensive practice, but for an improvement of it, by separating physic from surgery and pharmacy, which I think incompatible with them. . . .

To bolster up his arguments, which seem so unnecessary in this age, Dr. Morgan continues:

In the more laborius occupations of life, as in building a house or a ship, a great variety as well as a great number of artizans are employed, but all in different departments.

In the less laborious callings we observe the like prudent regulations, thus in making a pipe, a button or a pin, a variety of hands, no less commonly than five, six, or seven different artists unite their industry . . .

Why should the more difficult, but more ingenious and liberal arts, scorn to be taught wisdom from the example? Is it easier to understand the intricate structure of the animal frame, the work of God, than to learn the con-

struction of any machine, as a watch or clock, the work of human invention? . . .

Having thus fully explained the method I propose for practising physic, in this place, I appeal to the impartial judgment of the public to decide the question.

The preface occupies twenty-six pages of text.

We then come to the more important part of this work. There is "A Synoptic View of the Following Discourse, to serve as an Index." This is two pages long.

The discourse is addressed "To The Trustees of the College, and the Citizens of Philadelphia." It occupies sixty-three pages of printed matter. It is an appeal for a distinct medical department of the College and resulted in the first medical school in America.

The following is quoted from this historical document:

What I am to propose is a scheme for transplanting *Medical Science* into this Seminary, and for the improvement of every branch of the healing art. . . . Health is that choice seasoning which gives a relish to all our enjoyments. As the end of medical science is to restore and preserve health, the welfare of every individual, of whatever age or sex, is concerned in the improvement of it amongst them. . . .

To hint at the means, whereby we may accomplish the institution of Medical Schools in this city, and to point out some of the most considerable advantages it must be attended with, is the talk in which I am here to engage. . . . According to the learned Gaubius, "Medicine is the guarding of life and health, against death and disease." . . . The various branches of knowledge which compose the science of medicine, are Anatomy, Materia Medica, Botony, Chemistry, The Theory of Medicine, and the Practice. . . .

Under The Theory of Physic, Dr. Morgan included "the more important doctrines of Physiology and Pathology."

Pathology treats of the vital, animal and natural functions in a morbid state, as Physiology does in a sound healthful condition. . . .

Let no man lay claim to the dignified title of Physician, who is not thoroughly conversant in the medical institutions. Without this knowledge, we have no better right to take upon us the cure of diseases than a blind man to judge the colours, or a deaf man of sounds. . . .

The great extent of medical science, which comprehends under it so many different branches, makes it impossible to learn it thoroughly without we follow a certain order. . . .

The order which I would recommend in the study of Medicine is to begin with Anatomy; then what I have called Medical Natural History, viz. The Materia Medica and Botony; Chemistry should follow; the Institutes come next; and the study of Practice should complete the work. . . .

Thus I have sketched out a general plan of studying Medicine, which will be of the highest consequences for students to observe. It belongs to the teachers of the several branches, to give more minute directions with regard to the particular conduct of each respective one. It will not be improper however to observe here, that young men ought to come well prepared for the study of Medicine, by having their minds enriched with all the aids they can receive from the languages, and the liberal arts. . . .

Easy it is to fall into errors, hard to recover ourselves from them. . . .

Why should we be deterred from establishing like institutions of Medicine in this seminary, especially as so many circumstances conspire to invite and encourage so important an undertaking. . . .

The establishment of a medical library in this College would prove another benefit to students, and tend likewise to influence their resort hither. . . .

The growth of this and the neighboring Colonies calls aloud for a medical institution. . . .

I propose in a few months to employ myself in giving a course of lectures on the Materia Medica. . . . Next year I design to attempt a course of lectures upon the Institutes or Theory of Medicine. . . . Possibly in a few years more, persons duly qualified may offer to undertake full and compleat courses of every branch of Medicine. . . .

Dr. John Morgan concludes his Discourse with an appeal to the Trustees, which led to the founding of the medical school, now the Medical School of The University of Pennsylvania. In part, this appeal reads:

To the Trustees of the College: . . . Under your patronage we may hope that Medicine will put on the form of a regular science. . . . Perhaps this Medical Institution, the first of its kind in America, though small in its beginnings, may receive a constant increase of strength, and annually exert new vigor. . . .

Later in life Dr. Morgan retired very much from active practice, actuated by his treatment by Congress, which body removed him from the post of Director General upon charges from which after a long controversy he was ultimately exonerated. There is no doubt he lost interest in his professorship for, in a communication from the professors to the trustees of the University in December, 1788, a part reads:

The faculty are of the opinion that the Medical School suffers for want of a course of lectures being delivered annually on the Theory and Practice of Physic.

In October, 1789, Dr. Morgan, a prematurely old man, died at the age of fifty-four years.

BOOK REVIEWS

William Wood and Company offer SELECTED PAPERS ON INJURIES AND DISEASES OF BONE[1] by Sir William Ireland de C. Wheeler. This little book (148 pages and 100 illustrations) originally was published for private circulation in 1916 by Messrs. Drought, Dublin. The difference between the former and the present volume is that the present work is confined to one sphere of surgery, thus dealing only with closely associated injuries and diseases of bone. Primarily, the contents had their origin in lectures given at the bedside to senior students in Mercer's Hospital, Dublin; later they appeared in a different form as contributions to *The Lancet; The British Medical Journal; Surgery, Gynecology and Obstetrics; The Practitioner; The British Journal of Surgery; The Irish Journal of Medical Science*, and *The Medical Annual*. In reality the book is compiled to illustrate briefly a branch of the routine work of a hospital surgeon.

[1] SELECTED PAPERS ON INJURIES AND DISEASES OF BONE. By Sir W. I. de C. Wheeler, N. Y. Wm. Wood & Co., 1928.

A worth while work which may be read with profit by the undergraduate, the general practitioner and the surgical specialist.

We have received a copy of the fifth edition of THE PRINCIPLES AND PRACTICE OF OBSTETRICS[1] by Joseph R. DeLee. As most physicians know, it is a large work, 1140 pages in length, and has 1128 illustrations, 201 of them in color.

Dr. De Lee's work is one of the standard; it is known to student and practitioner. It is a good book, an excellent book; a book that covers the subject to the minutest detail. For ourself, we would have it shorter. We would have many parts edited down to almost the vanishing point. However, the part we would cut out would be the part three score physicians would want in detail on the morrow. So perhaps the author knows more about his craft than we do, all said and done.

Should we be asked to name three works on obstetrics every physician should have, we would include Dr. De Lee's book among them. We have read it for pleasure; we have studied it; we have used it as a reference work and never has it failed us. And after all what more can one say of any scientific endeavor?

We have also before us a very comprehensive presentation of the subject of the surgery of muscles, tendons and fascia.[2] Practically every phase of the subject has been presented. With characteristic thoroughness, the author commences with the normal anatomy and physiology and regenerative and degenerative processes in muscles. Then the various muscle lesions are discussed—the infections, parasitic diseases, tumors, traumatic injuries, contractures, etc. Next, the subject of the tendons is presented in the same thorough manner. A very valuable feature of the work is the complete description of the various operations performed on the tendons. The various methods of tendon shortening and lengthening, tendon transplantation and the indications for their use are fully discussed and made clear by abundant illustrations and drawings. A third main division of the work is devoted to the fascias. The anatomy and physiology are

[1] THE PRINCIPLES AND PRACTICE OF OBSTETRICS. By Joseph R. De Lee, M.D., Phila., W. B. Saunders Co., 1928.

[2] DIE CHIRURGIE DER MUSKELN, SEHNEN UND FASCIEN. Von Prof. Dr. W. Muller. Lieferung 21, Die Chirurgie, herausgegeben von Dr. M. Kirschner und Dr. O. Nordmann. 8 vo. Paper. Berlin, Urban & Schwarzenberg, 1928.

first presented. Then there follows a complete discussion of traumatic lesions, contractures and degenerative processes with special reference to Dupuytren's contracture, tumors of the fascia, etc. A generous allotment of space is given to the surgical procedures indicated in fascial lesions. Numerous enlightening illustrations are an important feature. The work consists of over eleven hundred pages and is indeed a thorough and complete "arbeit."

Another book from abroad is Schematische Skizzen zur Einführung in die Chirurgie.[1] This book of 216 pages is a unique attempt at an introduction to surgery. Throughout the author constantly holds to the premise that practical observation in education is much superior to didactic methods, and with this idea in mind, he stresses clinical facts and data rather than theoretical considerations. As far as possible the author resorts to variegated and colored illustrations and drawings to convey his facts. Things that the student sees in the clinic are impressed diagrammatically and schematically rather than by extensive descriptions. The reader is impressed largely through his visual sense. The actual text is thus quite limited. Whenever it seems helpful to an understanding of a subject, the underlying physiology is briefly reviewed. Principles rather than theory are stressed as the ground work of surgery. The medical student, whose problems are yearly becoming more complex, will find his understanding of the elements of surgery greatly facilitated by study of this clear and concise book.

[1] Schematische Skizzen zur Einführung in die Chirurgie (Mnemotechische Propoedentik). Von Dr. Th. Naegeli. Leipzig, F. C. W. Vogel, 1928.

BOOKS RECEIVED

All books received by The American Journal of Surgery are listed in this column as soon as possible after their receipt and this must be considered as adequate acknowledgment. Books that the Editor considers of special interest to our readers will be reviewed in a later issue.

Collected Papers of the Mayo Clinic and Mayo Foundation for 1927, Vol. xix. Edited by M. H. Mellish and H. B. Logie. 8vo, cloth. Pp. 1330, 412 illus. Phila., W. B. Saunders Co., 1928.

Clinical Medicine. By O. W. Bethea, M.D. 8vo, cloth. Pp. 700. Phila., W. B. Saunders Co., 1928.

Operative Surgery. By J. S. Horsley, M.D., F.A.C.S. Ed. 3. 8vo, cloth. Pp. 894, 756 illus. St. Louis, C. V. Mosby Co., 1928.

Addresses on Surgical Subjects. By Sir Berkeley Moynihan. 8vo, cloth. Pp. 348, illus. Phila., W. B. Saunders Co., 1928.

The Duodenum: Medical, Radiologic and Surgical Studies. By Pierre Duval, Jean Roux and Henri Béclère. Translated by E. P. Quain, M.D. 8vo, cloth. Pp. 212, 127 illus. St. Louis, C. V. Mosby Co., 1928.

Gynecology. By W. P. Graves, M.D. Ed. 4, revised. 8vo, cloth. Pp. 1016, 562 illus., 128 in color. Phila., W. B. Saunders Co., 1928.

The Newer Knowledge of Bacteriology and Immunology. Edited by E. O. Jordan and I. S. Falk. 8vo, cloth. Pp. 1206, illus. Chicago, Univ. of Chicago Press, 1928.

International Clinics. Edited by H. W. Cattell, M.D. Vol. II, 38th Series. Phila., J. B. Lippincott Co., 1928.

Nurses, Patients and Pocketbooks: Report of a Study of the Economics of Nursing, Conducted by the Committee on Grading of Nursing Schools. 8vo, cloth. Pp. 630, 61 diagrams. N. Y., Published by the Committee, 1928.

Allgemeine und Spezielle Chirurgische Operationslehre. Von Martin Kirschner und Alfred Schubert. 8vo, paper. Pp. 656, 709 illus. Berlin, J. Springer, 1927.

Differentialdiagnose der Chirurgischen Krankheiten des Kopfes, des Halses und der Brust. Von F. Honigmann. Crown 8vo, paper. Pp. 170. Breslau, Th. Steinkopff, 1928.

Konstitutionspathologie in der Orthropädie: Erbbiologie des peripheren Bewegungsapparates. Von Berta Aschner und Guido Engelmann. 8vo, paper. Pp. 320, 80 illus. Berlin, J. Springer, 1928.

Die Körperiegene Freie Fascienverpflanzung: Ihre experimentellen Grundlagen und ihre praktische Anwendung. Von Ernst König. Vorwort von M. Kirschner. 8vo, paper. Pp. 308, 118 illus., 2 tables. Berlin, Urban & Schwarzenberg, 1928.

Greffe Ovarienne et Action Endocrine de L'Ovaire: Étude Histologique, Biologique, Clinique et Chirurgicale. 8vo, paper. Pp. 488, 181 illus. Paris, Gaston Doin et Cie, 1928.

Bulletins et Memoires de la Société des Chirurgiens de Paris. Séance du 18 Mai, 1928. Par les Soins de M. C. Buizard et M. M. Haller. 8vo, paper. Pp. 56. Paris, Gaston Doin et Cie, 1928.

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